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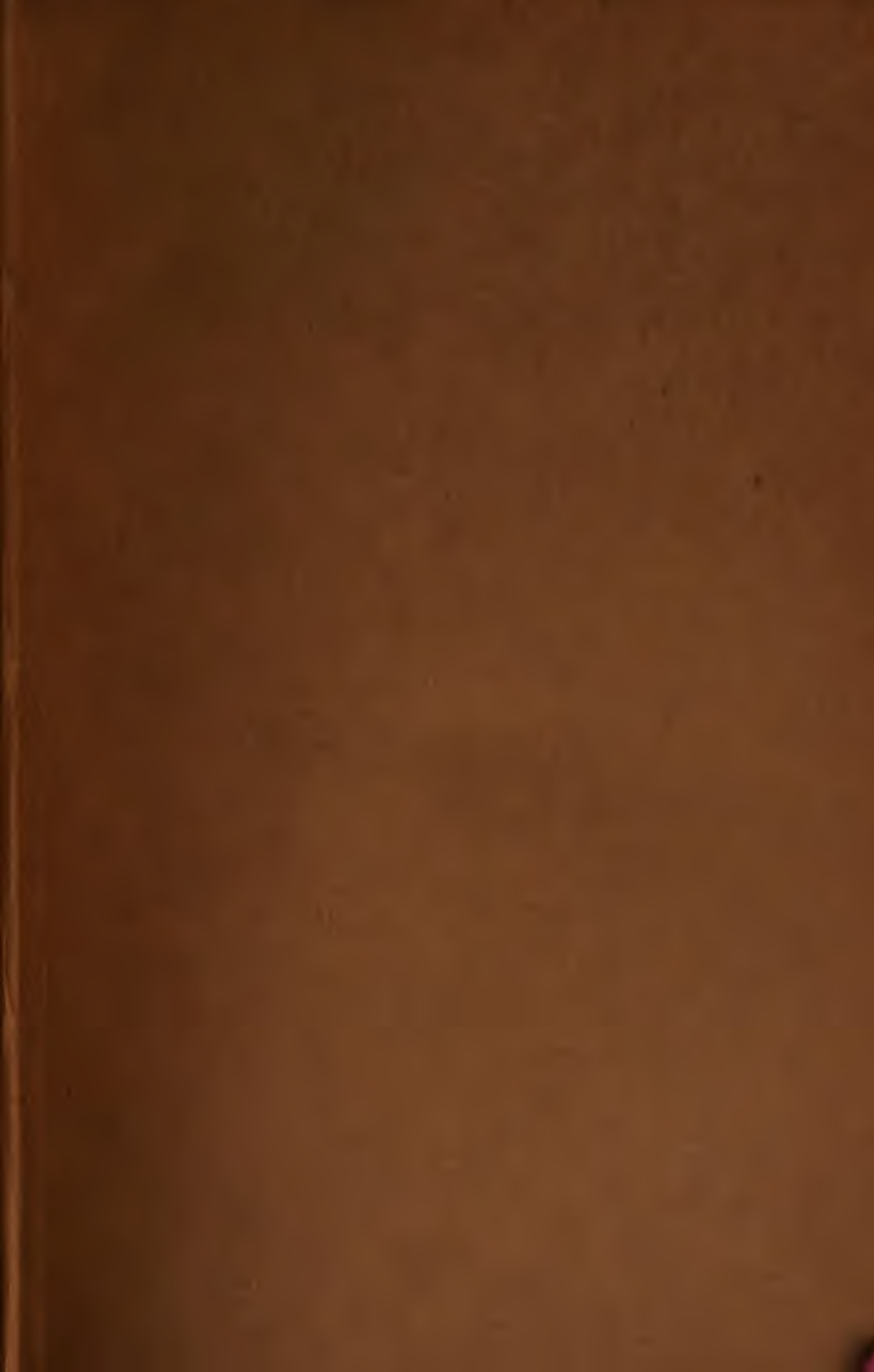
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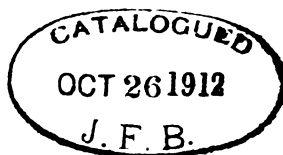
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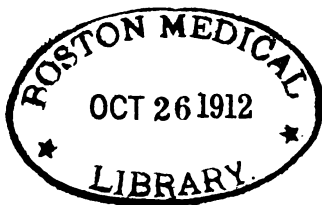
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BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL
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PRESIDENTIAL ADDRESS.

By W. J. TYSON, M.D., F.R.C.P., F.R.C.S.,
President of the Society.

"SOME REMARKS ON OUR SOCIETY AND ITS WORK."

IN the first place I thank the Fellows of our Society, for the second time in its history, for having chosen a Folkestone man to preside over its proceedings. Your first President, Dr. Henry Lewis, an old friend and patient of mine, ably conducted your affairs; he has been followed by men distinguished in spa and marine knowledge, and I trust, by my accepting the chairmanship you have kindly offered me, that the Society will not suffer in prestige and distinction. I will do my best to maintain its honour, and I feel sure you will give me your cordial support.

I do not propose to give an address on any scientific subject in connection with climate and bath treatment, but rather some stray thoughts bearing more or less on subjects which, I think I may say, come legitimately within the scope and wishes of our Society.

When looking about as to what I should say in my

address, I thought in the first instance I would systematically read through a standard work on the subject of climate and bath treatment ; this I have done, but I must confess with a good deal of disappointment, and the thought has again and again come into my mind whilst reading, what a poor substitute this is for seeing the spas and climates for oneself !

I am somewhat favoured by living in a town practically between our own country and the Continent, and constantly seeing people who are going and coming from various spas, or health resorts ; this, I think, has given me a knowledge which, except for my accidental position, I should not otherwise have possessed.

Again, in the earlier part of my life I made opportunities of visiting many of the home and foreign spas and climates—in fact, for some ten years I took my holidays in this way.

It is rather strange, but exceedingly useful, that these places to a large extent occur in groups, and hence several of them can be visited in a short time with comparative ease, a fact which I have not seen noticed in books or papers, although it must be more or less known ; let me give you a few examples :—Arcachon, Dax, Biarritz, those in the north of Spain, Pau and the Pyrenees, the latter including Cauterets, Eaux-Bonnes, Eaux-Chaudes, Luchon, Saint-Sauveur, Barèges, Bagnères-de-Bigorre.

A second group includes the marine places extending from the Hyères to Alassio, including Costebelle, Cannes, Nice, Mentone, San Remo and Bordighera.

A third group, in the middle of France we have Vichy, Royat, Mont Dore, La Bourboule, and St. Nectaire, and again further north to the east, also in France, we have another group of interesting places, such as Plombières, Contrexéville, Vittel, all in the Vosges district.

Again, coming down the Rhine, we have Ems, Schlangenbad, Kreuznach, and not far off we have Homburg, Wiesbaden, Schwalbach, Baden and Wildbad. I might go on giving other groups of places in Europe, but let this suffice. Coming to our own shores, we have most useful

centres, such as Malvern and Droitwich, Buxton and Matlock, Harrogate, &c., &c., so in our country and abroad very pleasant and inexpensive trips can be taken, combining the gaining of medical knowledge with the enjoyment of many scenic and architectural beauties, which so frequently exist within and around English and Continental spas.

I may just mention at this point that there are now special arrangements made abroad for promoting the visitation of health resorts by medical men at most moderate rates, and in a most comfortable way.

Our Fellow, Dr. Leonard Williams, has more than once called attention to this important advantage in our Medical Press which our profession now possesses.

What first led me to think of the value of knowing about health resorts, or rather I may say of the loss of not knowing about them, was the following incident that occurred early in my professional life: I had the misfortune to contract scarlet fever from a patient, and this attack was followed by albuminuria. The latter continuing for some time, I consulted a well-known London hospital physician as to the course to pursue; he advised me to go abroad for six months, preferably to take a sea voyage, which I did. A more miserable time, I think, I never spent. The ship was not well found, my companions were not agreeable to me, and the captain was unfitted to occupy his position. When I came home I determined never to subject a patient to such an ordeal as I had been through, and at the same time to take every opportunity, before sending patients away either at home or abroad, to find out something of the place where they should be sent to, and the conditions under which they ought to be treated.

My physician, I feel sure, had never been abroad, certainly not on the high seas; if he had he would have given more particulars, as to ship, destination, time of year to go, and length of stay.

Now this brings me to say something about what are the real objects of our Society, and I do so with some diffidence. I do not think that everyone in our profession should take

upon himself to recommend health resorts to his patients unless he possesses some knowledge on the subject. This knowledge is special and it requires considerable time in acquiring, for health resorts differ most widely in many ways, such as to climate, waters, and social surroundings, both at home and abroad. I think that it is sad, and something worse might be said, to see how almost recklessly people are ordered abroad after perhaps a ten minutes' interview. As a well-known writer has said, in prescribing a climate or a mineral water we must first of all remember that the name of a disease never suffices to indicate the appropriate remedy.

Whether a patient suffers from anæmia, diabetes, tuberculosis, heart disease, or dilatation of the stomach, the particular disease label is of little worth from a therapeutic point of view. A much broader outlook is essential, a general physiological stocktaking is called for.

When the case is fully grasped our efforts must in the main be directed towards restoring disordered functions. For this purpose the malady must be traced to its source. Anæmia, for example, may arise from loss of blood, from chronic suppuration, from insufficient supply of iron in the food, from the absorption of toxins as in constipation, from an infective process as in pernicious anæmia, from derangement of the blood-forming organs, such as in leukæmia and kindred ailments.

To treat the case successfully we must deal with the cause. Reasons of this kind may lead us to prefer Harrogate, or Royat, or Levico, or Marienbad, or Homburg, or Tarasp. But that is not enough. We must examine whether the patient has some reserve vitality in his digestive, circulatory, respiratory, muscular, and renal systems likely to respond to a demand for a higher rate of tissue change, or whether he is a person of low vitality, with little power of response in the main organs of animal life.

The choice between Schwalbach and St. Moritz would in some instances be determined largely by such considerations. Throughout the whole range of diseases influences

of this kind must be weighed, equally with the nature, intensity and extent of the morbid condition, before we can be fairly sure that our choice is right. Then the temperament of the patient must be considered, as to whether she or he should remain in England or go abroad. There are certain people who hate everything foreign, and to send these abroad is not only useless but detrimental. They start the journey by being violently sick in crossing the Channel, and they remain mentally and morally sick during the whole of their Continental sojourn. Then the question of a companionship arises; some people are better alone, others are miserable without someone. If a nurse, servant, or companion is taken, then it is most important that the right kind of person should accompany the patient. Sometimes the treatment wholly breaks down through the unsuitability of the nurse. Another rule to remember is not to send poor people abroad; to be considering the spending of every franc, and having to deny oneself ordinary comforts, is to court failure in spa or climatic treatment.

When we are consulted as to the where, when, and how in reference to a climate or spa, considerable special knowledge is required, as the above remarks show.

It is not my intention in this short paper to compare English and Foreign places; each country has its own peculiar characteristics, and it is the pride, and I may say the advantage, of our Society that we have Fellows in all countries. The advantages of being treated "at home" are often quite obvious, such as the saving of time, being treated by one of our own nationality, and the insular liking for one's own country, which is characteristic of many Englishmen; as against this, many, on the other hand, enjoy the change of diet, of scenery, of the weather, and general environment.

There is a point upon which we are often consulted, and on which physicians give various opinions, viz., the advisability or not of moving a patient. Of course this decision depends naturally on many things: the physical and moral condition of the patient, the mode of journeying, the urgency of the cure, the great desire to go home, or the reverse, to get

away from home. Now my own opinion is that there are very few physical conditions that we meet with which forbid us recommending a journey, if other circumstances are favourable.

Formerly, when patients were removed in coaches or carriages with rubberless tyres and no internal conveniences, or, in other words, when no road ambulances existed, one can understand the doubt and unwillingness of doctors and friends to advise a journey; but now, when all railways have special ambulance carriages, and also allow beds to be placed in first and second-class carriages—again with the advent of motor ambulances, or cars fitted up as such—the former reluctance to removal has almost disappeared.

I mention the above, as I think still that there are people who, although ill, would suffer no ill-effects from travelling to some health resort; and again people are sometimes, quite honestly, kept in out-of-the-way places, longing earnestly to go home, who are kept tethered on account of the fear that something may happen on the journey.

I have allowed patients in almost every condition of sickness to be removed, with practically no disadvantage to the physical state, but immense joy to their minds.

I think that a moderate temperature, even up to 101° or 102° , is in itself no bar to travelling; it is certainly better than a temperature under normal.

NATURAL AND ARTIFICIAL WATERS.

Again, we often hear, in reference to natural waters, that they contain certain salts, which can be collected and mixed in the proportion that they exist naturally, and made into an artificial water, resembling chemically in all details the water that they are supposed to represent; thus some say that by manufacture every natural water can be imitated, and can be used equally well as the former in whatever place one wishes to try them. Now, the above statement I much doubt, and in my mind no artificial water has quite the same characteristics or effects as the natural one; and I think, in attempting to carry the above thought into effect, we are doing injury to the place where, so to speak, the natural water grows, and

to our patients, who are not getting the full hygienic effects of the water cure. Chemistry has never yet succeeded in making a diamond or a ruby exactly like natural ones, although chemically the materials in each are known to be the same. There is something in nature which defies exact copying, except by natural means. Men of the greatest experience in bath treatment will tell you that they only obtain the greatest results in treatment when the natural waters are employed, even after they have discounted other means of cure, such as the "expectation of cure," the environment of the place, regularity and appropriateness of diet, and mental detachment. In association with the above, one might mention the difference in prognosis between the albuminuria which follows from so-called cold and that which succeeds to an attack of scarlet fever. Pathologically and microscopically the kidney in each case is identical, yet one knows from experience that one would be happier and more hopeful in the prognosis of scarlatinal albuminuria than in the other.

Nature has provided these various waters in many different places; it is our business to find out their values in diseases that come under our notice, and use them to the best of our ability. The railway and motor car have practically placed them in the reach of all. The same remarks apply more or less to climate.

There is a subject, connected pretty closely with our work in climatology and balneology, which requires rather delicate handling, viz., the ethics of the above. I have hesitated more than once in bringing this forward, but already Dr. Leonard Williams has touched upon it, and I venture to add a few more words.

I think that we must admit that spa conditions lend themselves somewhat to exaggerative methods of treatment, and we, as practitioners, require some moral courage to keep those who are in charge of the baths and other things in a right position. We are constantly being urged by officials connected with these establishments to do things which seem to me to verge rather dangerously near to quackery. I take it that all spas and health resorts, &c., should be practically

in the hands of the physicians so far at least as the medical treatment is concerned, and I think that it would be a good and wise thing if more of our profession took part in the municipal affairs of their own town, so that everything in connection with the real welfare of the place, whether social, moral, or physical, should have the advantage of the influence of a cultured gentleman.

How far health resorts should be advertised, and if so by what methods, I think should be carefully considered. Half of the advertisements, especially in regard to death-rate, are valueless. I do not think that the prevalent practice of attending the servants of an hotel, in order to obtain the recommendation of the visitors, is a good one. It is one of the most difficult points for those practising in the above to know sometimes what course to pursue. Personally, I think that the most open and fairest way would be for all the names of those practising at a health resort to be placed somewhere in the hotel, or baths, where they can easily be inspected by those wishing to see them. This is done at some spas, for example, at Aix-le-Bains.

Our Society is already British in its constitution, and in its list of Fellows it is universal. It is firmly established ; it should and does maintain a high position ; but is there not an extended use for it ? A good library should not only be in existence, but should constantly be added to, and in this work all our Fellows should take their part. Again, might it not be wise sometimes to have an international meeting, say once in three or four years ; or might we not establish a select consultative sub-committee from among us to give individual members any special knowledge in reference to either old or new places, and the conditions which appertain to them ?

What I should like to see more and more recognised by the profession at large is that the British Climatological and Balneological Society is the really recognised body which, through its Fellows, can give decidedly special information in connection with all health resorts and spas, whether home or foreign. The recommendation of places has been in the past far too much in the hands of publishers of cheap popular

books, and patients have often consulted these rather than those who possess special knowledge on the subject.

As I said at the commencement of this address, so I say again, that the thoughts expressed are stray and straggling in character, which have been dotted down at spare moments, but which I trust, nevertheless, are of some interest to those who hear or read them.

In conclusion, I feel sure that all of you wish with me that we may have an interesting and successful session, and that we may part, as we have begun, in good fellowship.

Original Communications.

THE NORTH WALES LITTORAL.

BY S. D. CLIPPINGDALE, M.D., F.R.C.S.

AN examination of the proceedings of the British Balneological and Climatological Society reveals the curious fact that, during the twelve years' useful work of the Society, the Health Resorts along the North Coast of Wales have never been dealt with. A brief record, therefore, of impressions formed during a visit paid last summer may not be altogether inappropriate as an attempt, however crude, to fill an otherwise singular omission.

The North Coast of Wales extends from the estuary of the river Dee on the east to the Isle of Anglesey on the west; and the places most visited by those in search of health or recreation are, proceeding from east to west, Prestatyn, Rhyl, Pensarn, Llandulas, Colwyn Bay, Llandudno, Deganwy, Penmaenmawr, Llanfairfechan and Beaumaris. All these places have much in common, yet with considerable local diversity. Thus, while all are on the north coast, so sinuous is the coast line that different places have different aspects, and almost every point of the compass is faced by one or other of them. For instance, while Rhyl and Colwyn Bay look due north, Penmaenmawr and Llanfairfechan look west, Llandudno looks north-east, Deganwy looks south-west and Beaumaris looks south-east. This diversity of aspect, however, does not seriously affect the climate of these places. Their climate appears to be influenced more by the contiguity or otherwise of the mountains near them. For example, Rhyl lies on level land, practically in the estuary of the river Clwyd, up the valley of which come soft south-west, moist-laden winds, rendering the amount of humidity at Rhyl greater than at those places sheltered by mountains from south-west winds. The remarks which apply to Rhyl apply also to Llandulas and to Llandudno, open on the south-west to the valleys of the rivers Dulas and Conway respectively; while Beaumaris is fully exposed on the south-west to the winds which blow through the Menai Straits. On the other hand, mountains approach

so closely to the sea at Colwyn Bay, Penmaenmawr and Llanfairfechan, as to afford considerable protection to these places. Not only does the proximity of the mountains protect these places from south-west winds, it protects them also from winds approaching from the sea; for such winds find the "situation occupied," so to speak, by a layer of air already in contact with the mountains at the back. This phenomenon has long been recognised as the reason why Great Malvern, situated on the eastern slope of the Malvern range, does not suffer keenly from the east wind, and has been applied by Dr. Leach,¹ doubtless with good reason, to the same immunity enjoyed by those places on the north Welsh coast closely backed by mountains. The varying contour of the coast, as to hill and dale, has also a more direct effect upon the exposure to, or protection from, ocean-borne winds of certain places in the vicinity. Thus, while Beaumaris, by the high table land of Anglesey, and Llandudno, by the Great Orme's Head, are protected from north-west winds, other places, devoid of such protection, feel fully the force of such winds, especially when there are valleys behind them up which the winds can blow, as at Rhyl and Llandulas.

With regard to climate, it is a question whether any part of North Wales can be described as "bracing" in the sense in which that term is applied to places on the east coast of Scotland, or of England, which are open to air purified by contact with the ice around the North Pole and drawn south by the vacuum created in the Equator region. Such cold, pure air cannot possibly reach the North Coast of Wales, land locked as it is by England on the east and by Scotland on the north, and warmed, moreover, by the Gulf Stream coming in from the west. Of course, North Wales is relatively more bracing, or rather less mild, than South Wales, just as North Devon is less mild than South Devon. But for increasing our patient's "power of resistance," or his "opsonic index," no place in Wales or in the West of England can compare with places on the East Coast of Scotland or of England anywhere from Nairn down to Dover.

¹ Leach : Report to the Royal Medical and Chirurgical Society, 1902.

For persons suffering from chronic maladies, such as gout, bronchial catarrh and emphysema, or from the later stages of phthisis, or convalescent from acute illness or from injuries, the coast of North Wales is doubtless admirable, especially during the winter months, when the temperature is relatively high, the daily variation small, and the amount of sunshine considerable.

With regard to the place we should select for a patient, much would depend upon the patient's age and tastes. If he is young and vivacious he will be happier where "something is going on," as at Rhyl, Colwyn Bay or Llandudno; at which places the usual amenities of seaside places in the way of entertainments are in full swing. If he is a valetudinarian, or a man of literary tastes seeking repose, it would be well to send him to Penmaenmawr, Llanfairfechan, or other places devoid of piers and promenades. Beaumaris is a place in many ways very different from its neighbours. Steamboats call there, but there is no railway, and the usual mode of approach is by a carriage drive of six miles from Bangor, the nearest railway station. Thus secluded, Beaumaris has advantages which, for certain cases, are obvious.

In the matter of recreation, the district abounds in opportunities for sport and health-restoring exercise of all sorts. Bathing is excellent at all places along the coast, the sand being clean and the water shallow. Sea fishing can, of course, be readily obtained, and fresh-water fishing is to be had in the rivers Clwyd and Conway, and in the lakes at Bala, Capel Curig and Llanberis. Riding, shooting and golf are easily obtainable. Mountaineering, for those strong enough for it, is close at hand; and for those who "fain would climb yet fear to fall," a comfortable tramway is provided to the summit of Snowdon. The lover of the picturesque will confess that North Wales closely rivals Switzerland, and drives through the Sychnant and Llanberis passes will leave mental pictures of beauty not easily effaced. Students of ethnology, geology, botany or philology, will find much to interest, and probably instruct; while the antiquary will find himself within touch of half a dozen castles, two cathedrals, and other places of historic interest.

THE USE OF WATER AND HEAT IN THE TREATMENT OF RENAL DISEASES.

BY PHILIP MARVEL, M.D.

ATLANTIC CITY.

THE influence of hydrothermal therapy upon the human body in both health and disease is no less a complex question than is the study and administration of various other remedies. The individual, as well as the disease, becomes an important subject of careful study, from the standpoint of temperament, environment, idiosyncrasy and psychical influences; the disease from its local, systemic, incomplete or complete involvement, and its relational disturbances. Hydro-stimulation, with increased or diminished temperature, is, in many respects, closely related to mechanical stimulation, such as is incited by massage, cutaneous friction, and succussion, and induces a heightened or lowered tonicity in all the involuntary muscular structures in the areas directly or reflexly affected by the neural impulses set into activity through cutaneous contact, according as the period of stimulation may be a brief or an extended one. The influence of the stimulation for good or evil will be modified by the mode and intensity with which the contact is made and the degree of temperature employed. The responsive reaction under the influence of a topical application to, or a complete immersion of, the body in water at varying temperatures, constitutes the most important part of the treatment for the relief of disease and its varied complications. As a result of mechanical contact, by fluid or solid bodies under regulated control, muscular activity is increased, and this increase of muscular activity insures a larger production of animal heat, and augments the individual resistance against fatigue.

Whilst the primary stimulating effect of a sudden bodily contact with a liquid, the temperature of which is either very hot or very cold, is virtually the same, when prolonged, the secondary effects will vary quite as greatly as will the degrees of temperature separating the two; but I do not hold, as

some do, that the lowered tonicity and muscular relaxation in the arterial muscular fibres succeeding a prolonged hydriatic stimulation, partake of the same reaction and loss of power in the cardio-vascular system as is associated with partial and complete paralysis. In the former the reaction would seem to be one which lessens the cutaneous sensibility and diminishes the reflex excitability without primarily disturbing the central nervous system, beyond that of inciting neural impulses, and necessarily exhibits a different relation to the blood streams and blood-vessels than the relaxation and paretic dilatation which follows trauma, toxic infection, or any centric or peripheral paralysing cause; and when pathological changes do follow, as the immediate result of hydriatic procedures, they are always secondary. In the latter the pathological changes, as well as the functional disturbances, are more likely to be primary; therefore the physiological effect of hydriatic stimulation of the body will be that of an excitant and depressant; the therapeutic application that of a tonic and a sedative. Hence, in a word, the value attached to hydrothermal therapy, with relation to its accelerating and inhibiting action upon the cardio-vascular forces and the nervous mechanism of the body, may be stated as a tonic, strengthening the heart, prolonging its diastolic pause, and increasing the period of nutritive rest, without any toxic cumulative effect, such as follows drug stimulation, and a supporting force to the nervous system, through promoting a better and more nearly normal nutrition. When heat is applied at a high temperature to the body the capillary vessels dilate, become flaccid, and exhibit signs of loss of tension. If cold be applied, and not too long continued, the vessels will exhibit a tonic resistance and show evidence of a heightened tension in their walls. These facts have been made significant by pulse tracings, measurements of blood pressure, and recording of temperature data, some of which have been published by Winternitz, Strass, Wertheimer and Baruch.

I have observed the blood pressure rise as high as 32 mm. of mercury under the influence of the cold bath, and an equivalent lowering under the influence of a hot immersion

bath. In this connection it is of interest to call attention to statements made by Dr. S. Baruch, of New York, in a lecture at the German Hospital in Philadelphia, in 1897, in which he refers to some observations made by him. The doctor, in detailing his reports of the various cases, referred to repeated observations in which the pulse tracings of the same patient before and after a hot-air bath showed distinct evidence of a weakened ventricular contraction, absence of tidal and obtuse percussion waves, which condition was greatly improved after being subjected to a rain bath for one minute. In Case No. 1 he reports that previous to being placed in the hot-air bath the pulse was 70, temperature 98°, and respiration normal. Subsequent to exposure in the hot-air bath at a temperature of 185° for ten minutes, the pulse rose to 100, temperature 99·2° F., respiration 64. The patient was then subjected to a rain bath at a temperature of 80° F. for one minute, when the pulse became 72, the temperature 98·4°, and respiration normal. The decided improvement in the ventricular contraction, high and quick up-stroke and acute percussion wave, with marked tidal wave, is distinctly shown in the sphygmographic tracings published with the said lecture. Thus it is seen that after a thermal procedure administered to a healthy individual, the disturbed circulation which was produced by long exposure to heat rapidly improved under the influence of a hydriatic procedure when under proper control, and experience has proved the same to be true in disease when the conditions present are intelligently considered, and the treatment properly directed.

According to the observations of Strass and Wertheimer, after the application of general hydrothermal procedures to the entire surface of the body, they observed, with rare exceptions, a very large increase in the number of leucocytes; also a considerable increase in the number of red cells, and in the percentage of hæmoglobin. The maximum increase in the number of erythrocytes in eighty cases examined by them was 1,860,000 in the cubic millimetre, and the maximum increase in the number of leucocytes was almost thrice the number previously counted. The average increase

in hæmoglobin was about 14 per cent. It was further observed by them that the maximum increase in the red and white cells, as well as in the percentage of hæmoglobin, did not always occur immediately after the application. The highest figures were often obtained after the lapse of an hour or more. These remarkable physiological alterations in the constitution of the blood persisted for varying periods. Often the increase in the number of erythrocytes, as well as that of the leucocytes, could be demonstrated for at least two hours after the application of the bath, and in not a few cases the increase produced in the hydrothermal stimulation did not entirely disappear. There is, therefore, no doubt that the hydrothermal stimulation affecting the surface of the entire body releases the tensions in the deeper vessels, and improves temporarily the circulation in the superficial and capillary blood streams, thus adding a new impetus to the general metabolism and assisting in the release of many functional burdens. Surely we have knowledge of no therapeutical agent or agents that are capable of producing more decided beneficial results, easy of demonstration, and at the same time so harmless in their remedial effects, when employed rationally and under proper guidance, than the hydrothermal procedures.

With the foregoing as an introductory, let us now consider more particularly the subject in question, namely, the hydrothermal treatment of renal diseases.

Water is a very flexible agent, and the skin to which it is applied is a vast network of capillary blood-vessels, nerve terminals, and cellular structures, rendering it an important organ of sense, of temperature regulation, and of secretion. Thus, the sensory nerve apparatus of the skin becomes to the human organism, by reason of its temperature sense, and direct and reflex receptability, as a sensitised plate to the photographer; therefore, the intimate relation existing between these cutaneous functions and the functions of the remaining portions of the body, renders the former a proper point of attack for beneficial or harmful influences. The hydrothermal application of water and mechanical stimulation, the influence of which is reflected through the sensory,

motor, and vaso-motor tracks, affects directly and reflexly the general metabolism and eliminating forces. In the treatment of disease, in addition to the primary influence which one expects and readily obtains, we must not lose sight of the fact that one of the results of hydrotherapy is the re-establishment of circulatory equilibrium, the inhibition of nerve dissipation, and the restoration of normal metabolism.

In the brief references which will be made in this paper to the treatment of renal diseases, it is sufficient for our purpose to divide these diseases into two classes only—namely, acute and chronic. The symptomatology of each is so well known that I need not devote any time whatsoever to a description of the same, and therefore shall engage you at once in the discussion of the application of hydrotherapy in their treatment. In the acute as well as in the chronic form, the condition of the patient at the time of the treatment must invite our first consideration. Having given proper attention and thought to the particular deficient functional force or forces the evidences of the disease present, temperament, strength and endurance of the patient, one would proceed to use the application of hydrothermal therapy, with varying temperature, by means of the drip-sheet, blanket, topical or general pack, the tub or needle, and rain, spray, steam, electric light, or hot-air cabinet. In acute cases, if the temperature be high, urinary secretion be not abnormally lessened, unless the patient be too enfeebled, the intermediate or neutral immersion bath at a temperature of 94° to 98° F., with passive motion from six to eight minutes, may be used with great benefit, the patient to be wrapped in a blanket without further muscular effort, and allowed to remain quiet for eight, ten, twenty or thirty minutes, as may be required, after which time the different members of the body may be carefully dried without exposure, followed by a light surface friction or light massage. The immediate influence of such a procedure is often reactory and exceedingly beneficial. With those whose resisting power is sufficient, the reaction may be intensified by a quick douche or sponge at a temperature of 85° to 86°, lasting only a few seconds, and

followed by similar procedures to those above described. If the patient be too feeble to be tubbed, then the physician must exercise his judgment in the use of the complete or partial pack in a blanket or sheet at a temperature of 100°, 102°, 104°, or 105°, followed by a five, ten or twenty minutes' rest, and after that careful changing, with or without cutaneous friction or massage, and rest. The influence of these treatments, in some instances, may be enhanced by the internal administration of small quantities of water, frequently taken.

The treatment of the chronic cases will require a greater variance in temperature and mechanical manipulation than that of the acute. It is necessary, in some cases, to use the hot-air cabinet to stimulate the glands of the skin, so that they may assist in eliminating the toxins, which rapidly multiply, and which in part are thrown off by way of the cutaneous surfaces. In the majority of cases, however, of this class, it will be perfectly safe to follow the warm bath (which may be better applied at a lower degree, 90° to 96°, and those much enfeebled, 100° to 102°) by an exposure of eight to ten seconds, with a douche, pour, needle, or sponge, at a temperature of 78° to 82°, which may be gradually and daily reduced to 70°. In some instances it will be of advantage to allow the patient to be immersed in the warm tub for at least fifteen to twenty minutes, subsequently followed by a light shower, rain, or sponge, with friction or light massage. Neither the chronic nor the acute forms of renal diseases can be dogmatically classified. The time of the exposure, the temperature maintained and the procedure employed, all must be determined by the patient treated and the results obtained. It has been my observation that a few of these cases will not respond at all without prolonged immersion baths, whilst others are apparently ill-affected by extending the same. It is my belief that the average time should not be long, and eight to ten minutes has seemed a proper average for a number of cases. There are fewer objections to repeated treatments of twice or thrice daily than to very long exposures at any one.

time. Other forms of baths and applications may be used according to the ingenuity and judgment of the physician, as the therapeutic influence is most largely to be obtained from the temperature used, time of exposure, attention to a conservation of the patient's strength, and protection against too great a disturbance of the circulatory and nerve equilibriums. Certain special cases of nephritis, with dropsical effusions, such as are found in scarlet fever, diphtheria, small-pox and puerperal states, &c., with complications, require treatments of comparatively low or neutral temperature, or stimulating packs at times, including only a portion of the body, fortified by the use of the hot-water bag placed at a convenient position along the vertebra, preferably between the shoulders. If the blanket or pack be made at a temperature of 76° to 80° , the patient's body wrapped therein, artificial heat by means of the hot-water bag or hot-water bottle can easily be placed so as to stimulate the heat centres and prevent the stimulation contact becoming too severe. In not a few of these, and other cases of nephritis, when the patient is weak and anæmic, or anæmic with only a reasonable amount of resistance, it is good treatment to have him first snugly wrapped in a dry, warm blanket for ten to twenty minutes, before applying the moist or wet pack. The reason is obvious and needs no further dilatation.

Special attention should be called to that class of cases which is complicated by organic heart diseases, especially those of advanced myocardial and endocardial changes, with auricular or ventricular dilatation, and to those with limited cardiac changes, but advanced arterial changes. With the former, too much care cannot be exercised, and, with few exceptions, any hydropic procedure should be provided for on a bed or couch, or at least some easy means where pronation can be maintained with slight disturbance to the circulatory forces. When dyspnoea is marked, a semi-recumbent position, either dorsal or lateral, should be provided, and the psychological influence, as well as the immediate disturbance from the procedure, noted. Here, in particular, the knowledge and skill of the physician or nurse administer-

ing the treatment must be closely given to the patient, as much damage may follow a careless and undue amount of handling; too high or too low a temperature; too great a stimulation and consequent cardiac excitation from the mechanical contact of the water, as by spout, pour, or rain bath; too prolonged a treatment, thus contributing too great a disturbance to the circulatory forces.

In a word, the beneficial use of hydrothermic procedures in the treatment of renal diseases is found in the application and regulated control of mechanical and thermal forces, so intelligently manipulated that they become equally stimulating or sedative, as may be required, and to the weakened, overwrought, or excitably tensioned forces of the body, thus assisting Nature in her vital processes of tissue and functional restoration.

PERSONAL HYGIENE IN THE PROPHYLAXIS AND TREATMENT OF CONSUMPTION.

BY RICHARD COLE NEWTON, M.D.

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“Without hygiene climate is sounding brass and a tinkling cymbal.”—*Solly*.

WE have been familiar with the spread of tuberculosis among the coloured people in this country, and realise that it seems at present to be settling the negro question for all time. In the same way certain tribes of the North American Indians will, unless the ravages of tuberculosis be arrested, be in a few score years as nearly extinct as the buffalo. It is seldom that anything more graphic has appeared in health literature than an account of the spread of consumption amongst the Sioux Indians, by Dr. Robinson, Superintendent and ex-officio Secretary of the South Dakota State Board of Health. He says in part, “In the old wild life, the Sioux were a healthful people. They were probably not wholly free from tuberculosis in some form; if, however, the infection was present, it was not general. In 1863 began the reservation system among the Sioux of the Missouri. There are about 25,000 of them making fine progress in civilisation, living in houses, wearing citizen’s clothing, the children being educated, the families generally professing christianity, the able-bodied engaged in some form of manual labour, by which they earn the means of subsistence.”

For fifteen years subsequent to 1863, during which time the wild buffalo had been destroyed, and all of the Western Sioux had been brought under agency influences, the annual reports of the several agents were optimistic in relation to the health of their people, reiterating the statement that the Indians were now living under more healthful conditions, coming under civilising influences, dwelling in better houses and accepting the attendance of the agency physicians. The first mention of consumption in these reports was in 1878. In 1880 one agency reports that 5.26 per cent. of the deaths resulted from tubercular troubles. In 1881 consumption is

generally mentioned in the reports, and in 1884 it was said, "Consumption has a firm hold upon them."

Yearly, since 1886, the agents' reports have more and more teemed with fearsome tales of the ravages of the scourge. In 1880 there were in four of the leading bands 293 births and 208 deaths. Last year in the same bands the deaths equalled the births. A noticeable feature of the present condition of these unfortunates is the increasing percentage of tubercular affections amongst the children. Dr. Robinson says, fully 60 per cent. of the younger generation have some form of tuberculosis, and that fully 50 per cent. of these over the age of puberty die of the disease.

In a paper read before the Sociological Section of the National Association for the Study and Prevention of Tuberculosis, Dr. Walker, of Pine Ridge, South Dakota, says, "there is no inherent peculiarity of the Indian which renders him more liable to infection with tuberculosis than is a white man under like circumstances." Their average strength, endurance and vitality appear to be about the same as those of the white man, and yet there is a much larger percentage of them affected with tuberculosis. Dr. Walker thinks that tuberculosis had existed among them before they came into contact with the whites, but there were relatively few cases until after they had given up their nomadic life and settled down to life in houses. They were filthy when they lived in tepees, and filthy after they became house-dwellers. It was demonstrated by statistics, that the most cleanly among them were the most healthful, but it was never shown that the filth in which they lived caused tuberculosis at any time.

In their primitive life, their principal food was flesh. In times of plenty, they would surfeit themselves on raw or poorly cooked meat; at other times they would go hungry. They had no regular meal times. When they began to live in houses the government supplied them with an abundance of food, and in much greater variety than they had been accustomed to. They were also supplied with cooking stoves and utensils, so that their food was better cooked than when they lived in tepees.

During their savage life the clothing of these Indians was of skins fashioned in a primitive style, the same all the year round, except that in the winter they wore a robe. Their garments were never laundered or changed for reasons of cleanliness. They were often exposed to inclement weather with a scanty amount of clothing, and slept sometimes in tepees, sometimes in the open-air, with probably little covering. After they had settled down in houses, they were supplied with better clothing in sufficient quantities and with blankets and bedding. They built their houses small and low with tight dirt roof and a ground floor. They daubed every crack and crevice with mud or other material to prevent any ventilation. They imitated their pale-faced brother in their abhorrence of draughts. A heating and a cooking stove was provided for every house, and in cool weather these were both fired at once, and the Indians would crowd into these super-heated cabins and swelter there. They threw their slops about the door, as they did when living in tepees, but they did not move their cabin every few days as they had moved the tepees, so that the surroundings of the former soon became noisome with filth. They had begun the use of intoxicating liquor before they had adopted our civilisation in its entirety, so that nothing was wanting to induce the scourge and rectifier of outraged nature, tuberculosis, to settle amongst them. The lesson is but too plain, and he who runs may read it if he will.

The history above detailed is the history of our feeble attempts to civilise the Indian in many parts of the United States. Tuberculosis has been for years prevalent amongst the Indians in Western posts that have been especially salubrious for the Whites, as, for instance, Surgeons Chase and Barker, of the United States Army, reported from the Washington Territory, that of 219 cases of sickness occurring in the military post there, in the four years 1870-1874, there was only one of phthisis among the white soldiers or their families. Not a case of the disease had originated there, "but two or more cases which were imported had improved rapidly under treatment. Phthisis, however, is very prevalent and very

fatal among the Indians." This report was made nearly forty years ago. The Indian was filthy, idle and intemperate then, as he is now, and those in the Washington territory had given up the war path and their nomadic life long before the Sioux began to adopt our civilisation and acquire our diseases, consequently phthisis had made its appearance among them before we hear of it among the Sioux.

A study of the conditions among the negroes in this country shows that phthisis has increased among them in nearly the same relentless ratio that it has devastated the Indian reservations. In slavery days the negro was comparatively free from tuberculosis. He was not, however, immune, as is so often stated, but suffered from the disease only slightly less than the white man. In Charleston, South Carolina, for instance, from 1841-1848 the death rates from tuberculosis of the white and coloured people were the same, 2·8 per 1,000. Since, however, civilisation, alleged political freedom and a chance for education have overtaken the sons of Ham, they have become more and more tuberculous, until in 1900 in Charleston, their mortality from this disease reached the astonishing figure of 7 per 1,000. In other parts of the South the negro mortality is not so high, and it appears never to have reached a high figure in the rural districts.

As Dr. Jones sententiously remarked, in a paper before the Tuberculosis Congress last year, "no individual or society has yet studied the case of the negro sufficiently to say whether the racial element plays any part as a cause of this disease." The influence of environment is so tremendously in favour of tuberculosis among this people that it has been practically impossible to eliminate it sufficiently to discover the racial predisposition, if any there be. "Few of us realise the great difficulties under which this race struggles. A third of the race is yet living in one-room cabins. The possible danger of such an existence is indicated by a fact which I discovered last year, in a so-called two-roomed cabin. Two-thirds of the space in one room was filled by a stove and a table; one-half of the other room was filled by a bed. In this house thirteen children

had been born since the war, and twelve of the thirteen had died when they were children."

"The unusual and heroic struggle for an education under adverse conditions is often a potent cause of consumption among coloured students."

It is not only in his liability to consumption that the negro in the United States shows his non-adaptability to his present environment. His death rate is high in almost all diseases, and his general death rate is higher than that of the whites in almost the same proportion as is his death rate in tuberculosis. During the War of the Rebellion it was observed that 10 per cent. of the negroes who were reported sick from heat stroke died, while of the whites similarly afflicted only 4 per cent. died. This is a good comparison, as far as it goes, because at the time the individual members of the two races were living under practically the same environment, and because the negro is naturally less susceptible to heat stroke than the Caucassian. That the coloured man has less vitality than the white is unquestionably true, but to assert that he so frequently contracts tuberculosis by reason of an especial or racial predisposition is to beg the question.

It is impossible not to observe many analogies between the present condition of the negroes and that of the Indians. Both races have within a comparatively few years entirely altered their manner of living and have evinced conspicuous non-adaptability to their present environment.

And so it is with the Irish race in America. I will not weary you with the figures. Suffice to say that the Irish American is almost as liable to tuberculosis as the negro, and that the Irishman born in America is twice or three times as liable to die of the disease as the Irish emigrant. "Americanisation" is said to be beating down the splendid immunity of the Jew to tuberculosis. What does it all mean? Americans themselves are gradually becoming less tubercular, while the peoples who are trying to live like them, and live with them, are becoming more so. The explanation is by no means easy. If so good an observer as Dr. Salmon confesses that the means of arresting the disease amongst cattle are not as

yet understood, does it seem unreasonable that the problem of handling the disease in the greatly more complicated life of man should be so intricate ?

Talcott Williams has said that every case of consumption is a confessed failure of civilisation. It is no more so than is a case of drunkenness, of syphilis, or of typhoid fever. Nor is it as much so, because while we know the remedy to apply to each of the last-named conditions, for one reason or another its application seems impracticable. But in tuberculosis we do not really know the remedy or remedies. We are trying to discover them. It is idle to say that infection is the sole cause of consumption. We are all exposed, and practically all have the disease, so the pathologists tell us, and yet nine-tenths of us escape without any tangible symptoms. Why does the submerged tenth suffer ?

There is no question about the predisposing effect of many occupations. There is no need to remind you that stone-cutters, knife-grinders and cigar-makers are especially liable to consumption ; and that a difference at first blush so slight as changing the grinding from dry to wet adds years to the grinder's life. The latest statistics from Paris show that the upper tenements in that city have a smaller percentage of tuberculosis than the lower floors in the same buildings, although their inmates are poorer and more crowded together, the first-named lodgings being more exposed to the light and air and being further from the ground. So in New York City it has been demonstrated that there is more sickness from pulmonary and bronchitic disease on the north sides of the street than on the south, where the house gets more sunlight.

In Paris it has been found that fewer illegitimate children die from bronchitis and pneumonia in the first year or two of life than legitimate—the direct opposite from what we should expect. The very fact that they are less carefully tended, and presumably less luxuriously clothed and fed, seems to add distinctly to their power of resistance to pulmonary diseases. Pampered and overfed cattle, like the notorious herd of Jerseys of Queen Victoria, are especially

prone to tuberculosis; pampered and overfed children are not so liable now as they were once, since the habit of battening down the windows and piling on the flannels for fear the child would take cold is not so fashionable as it used to be. Over feeding would appear to be inimical to the progress of tubercular disease under some, but not all, conditions.

The Actuarial Society of America published an elaborate report in 1903, according to which the 20,000 dollar "risks" had turned out specially badly, only living out, I believe, about half of their "expectation." Luxury, it seems, is getting in its perfect work. Heretofore, however, we have been unaccustomed to consider it a cause of tuberculosis.

An interesting fact to be learned from this report is, that the commercial traveller is an unexpectedly good "risk" compared to men of the same age in other occupations. This can only be explained on the hypothesis that travel of itself is wholesome. Man was originally a nomad, hunting about for his food like other wild animals, and as he developed further, he was a shepherd and led his flocks about. And the wandering propensity (Wanderlust) is still a part of the normal man's disposition, and like other inborn traits, should be heeded.

Change of locality is of itself beneficial to the health in many instances. Perhaps the Irish in America illustrate this, the emigrants, as has been said, showing much better life histories than their children, born in this country. No really satisfactory explanation of the great prevalence of phthisis among the Irish-Americans has been advanced. From considerable study of the problem, the writer believes that the diet of these people has not received sufficient attention. The Irish seem to be intensely carnivorous, eating largely of meat with some of the coarser vegetables, such as potatoes, turnips and cabbage, none of which affords a large percentage of energy. They do not seem to eat a due proportion of good carbo-hydrate food; at all events, they subsist largely on baker's bread, which is about as nearly without nutriment as bread well can be.

The fine commercial instinct which pervades everything

in America has led to the production of loaves of baker's bread of immense size and little weight. They are puffed out like wind bags by, it is alleged, the use of alum or some other chemical. The bread, if soaked in milk or tea, becomes as soft as pap, and can be washed down without chewing. An American mode of eating, by the way.

It states in the life of Count Rumford, that this excellent observer and truly scientific man was greatly impressed by the vigorous health of the Bavarian soldiers, who subsisted on food which they bought out of their pay of four cents a day, or less, and which consisted largely of soup with such vegetables as beans. The Government, in addition, however, supplied each man with about 2 lbs. of good rye bread. Such a menu affords almost the ideal diet.

The Count seemed to lose sight of the effect upon the nourishment of the body which will follow the consumption of good, substantial bread, requiring much mastication. He was disposed to think that in some way, water prepared in soup developed some nutritive qualities. Whether this is so or not, enough is known of dietetics to establish the fact that the consumption of good, hard, bread crusts and drinking plenty of water, either hot or cold, should be the foundation of a working-man's diet.

I firmly believe that if bread were sold by weight it would do more to arrest tuberculosis than the strict enforcement of the anti-spitting ordinances, important as I acknowledge these laws to be. I have seen young Irish-American children come home from school and proceed at once to the cupboard and abstract sweet cakes bought at the bakery and made solely to attract the eye, and I presume tickle the palate, of this class of customers. After eating of these dainties, the future American citizen, with his decayed teeth, so rotten perhaps that he could not chew wholesome food; his neck probably adorned with scrofulous nodes and his posterior nares stuffed with adenoids, would perhaps, ignoring entirely the family dinner of corned beef and cabbage and liberal potations of tea, retire to smoke the manly cigarette, spend his evenings on the street corners, or, if a little older, in the saloon, or some more questionable

resort, and finally, retires to sleep in some small and ill-ventilated room with an assortment of bed-fellows, relatives and otherwise, with, however, the never-failing precaution that the windows were carefully battened down. The child, or young man, would probably be muffled in woollen garments, wear heavy woollen underclothes, and perhaps sleep beneath a feather bed, if not in one. In Ireland, poverty had kept the foolish parents from any such indulgence of their offspring, but in this free country, with the greater variety of food, higher wages and more general education (*sic*), the children are too much indulged, to the injury of their health and their morals.

We are told that wearing the white men's clothes is a principal cause of consumption among the Indians, and that animals and plants will sicken and die when their cutaneous respiration is interfered with. I am anxious to learn more of the truth of this alleged cause of tuberculosis amongst the savages. I can remember distinctly making a campaign during my army life with Indian scouts and some regular troops, in which the Indians coughed almost incessantly. The soldiers and officers had no colds. I was told that the Indians might have contracted theirs from taking sweat-baths, but, as they were living under the same conditions as we were, wearing soldier's clothes and eating soldier's rations, there seemed to be no reason for their greater susceptibility to colds. I was told by experienced officers that the red man is gradually becoming weaker and more prone to sickness. Personally, I am disposed to agree with Dr. Page and others who believe that much sickness, and especially consumption, may be caused by covering the body with raiment. So far as can be learned, Indians and negroes never suffered from consumption to any appreciable extent, until they began wearing our clothes. To be sure, they began at the same time to lead more idle and effeminate lives, get more bake-shop trash, baker's bread and impure milk for food, drink more whiskey, use more tobacco and herd closer together, and they began also the interminable struggle for an education, the students being especially liable to consumption. I think that enough has

been said to show that tuberculosis is a disease following maladaptation to the environment, improper habits and defiance of Nature's laws. Nothing will stop its ravages entirely except to force every man and woman to live by the physical conscience, and to devote a large share of life to preventing themselves and their neighbours from contracting the disease and from spreading it.

It took, as we have seen, fifteen years of so-called civilising influences to thoroughly infect the Sioux Indians of the Upper Missouri. Bad as those influences are, they would not have taken the same hold on people, like the poor Jews of Eastern Europe, who have for generations been accustomed to foul, contracted dwellings, modern woollen clothes, over-crowding, over-work and wretchedness.

The tendency to consumption is born in everyone. Flexner and other good pathologists tell us that at least 90 per cent. of human beings have at some time been infected. And we observe constantly that any sudden change of environment or *régime*, not by any means invariably to a lower social condition, may result in the development of this disease. Too much sexual intercourse, whether legitimate or not, an improper diet, the strain of too much study, the use of intoxicants, or inhaling smoke and dust—in short, anything that permanently weakens vitality and destroys or impairs the resistance of the body cells, is an invitation to the development of consumption in man or animals. And lastly, want of proper development of the lungs, the muscles and the vital organs is an important contributory cause, too little thought of.

If dairy cattle were exercised more, and never confined in stables, so that their bodily activity would promote normal metabolism, they would, in all probability, not suffer from consumption, just as horses are practically immune and sheep and goats nearly so. So if negroes and Indians should go back to the life to which centuries of evolution had fitted them, the disease would probably disappear from among them in a generation.

They are now paying the penalty of a sudden change from what was to them a hygienic mode of life to an unhygienic

one, and those of them that escape the devastation of the plague will have become comparatively immune, able to resist a higher degree of infection, and to remain free from phthisis under conditions which they can not withstand now.

The infection plays a secondary part in the production of consumption, and so does heredity; the principal cause is a man's life habits and environment. As the Imperial Board of Health of Germany has said, "It is impossible to extirpate all tubercle bacilli; therefore it is indispensable to so strengthen and harden the body that the absorbed germs cannot take hold upon it."

THE RELATIVE VALUE OF HIGH AND LOW ALTITUDE IN THE TREATMENT OF TUBERCULOSIS.

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I HAVE entered upon the consideration of this question that I might present a few observations which I have made, and a few conclusions which I have drawn from these observations, that bear upon the relative value of high and low altitude in the treatment of tuberculosis. While I recognise that our ideas are more or less influenced by our surroundings, and that men who practise at high altitude are apt to favour it in treatment, while those practising at low altitude are apt to think it best, yet we must divorce ourselves from such influences and discuss the question in an impartial manner, if we wish to arrive at the truth. The fact that one observer sees tuberculous patients do well at a high altitude does not prove that high altitude is the most advantageous place to treat tuberculosis; nor does the fact that another observer sees tuberculous patients do well at low elevations prove that such elevations are the best for tuberculous patients. These observations simply point to the fact that some tuberculous patients do well at high and others at low elevations; or, as it might be stated broadly, patients suffering from tuberculosis can get well at various altitudes. It remains, then, for us to discuss impartially, if such is possible, the conditions accompanying both high and low altitude, and then attempt to suit these conditions to the patient and his disease.

A few years ago it was thought that there was a specific climate for tuberculosis. Individuals suffering from the disease were led to believe that if they could only leave home and go to one of these favoured places that they could be cured. And they also felt that if they were to remain at home it was almost certain death. So strongly has this idea taken hold of the people that they are led to do many foolish things. They leave home without any idea of where they

are going, or what they are going to do when they arrive at their destination. The thing that they have uppermost in their minds is reaching this favoured clime. All else is secondary. But the time comes when the "favoured climate" is secondary, and meeting the conditions of life and adapting themselves to the climatic change are primary. These difficulties and annoyances could be largely eliminated by carefully advising patients before they leave home.

The task of choosing a climate for an individual suffering from a disease is one of great importance, for unless it is properly suited it is capable of doing harm. The idea is prevalent that any one can make a change of climate. So they can, but it is not everyone that can make an intelligent change. To prescribe climate requires as much skill as to prescribe drugs. In prescribing a climate for one suffering from tuberculosis, the disease and the individual must both be kept in mind.

The principles underlying climato-therapy are not so difficult, if only one stops long enough to understand them. The beneficial effect of a change upon nutrition is well known, even if the change be one only of surroundings, and not of climatic conditions. The effect of going to a less favourable climate than that in which one lives is often beneficial. How much more beneficial, then, should a change be which is carefully suited to the patient and his disease.

The primary effect of climatic treatment is upon metabolism. Its fundamental effect is upon tissue change, and its effect depends upon its powers of abstracting heat. The heat-abstracting power of a climate depends upon the temperature, humidity and the movement of the air. A cold climate, with much wind, makes the greatest demands upon the system for heat; a warm, humid climate, with absence of wind, should make the least. A dry, warm climate cannot be equable because the air does not hold heat well, and as soon as the sunshine ceases, or as soon as the shade is entered, the air becomes cool. The wide diurnal variation in dry climates is due to this fact.

A climate which makes great demands for tissue change

requires a hardy man to endure it. It would be unwise to send one who has low vitality and who endures cold badly to such a climate with the expectation of his deriving benefit from the change, for his forces would be overtaxed in supplying the normal waste incident to such rigorous conditions. On the other hand, such a patient would doubtless improve in strength and weight very materially if surrounded by such climatic conditions as would allow of the body cells keeping up the natural tissue change, and still having some power in reserve to apply to the building up of a stronger constitution. Cold climates are stimulating, while warm humid climates are enervating. Between these we have all grades, and so if we form a correct opinion of our patient we can find a suitable climate for him.

It must be remembered that climatic conditions change with the seasons. Thus the climate of the Rocky Mountain regions, at an altitude of 5,000 feet, is cold and rigorous in the winter but temperate in the summer. Many people who might not be able to endure the winter might profitably spend the summer months there.

One suited to life in cold, rigorous climate or at high altitude should belong to the hardier type of men, with good circulatory, digestive and assimilating powers. The young and robust are particularly suited to such conditions, while those in advancing years should be spared the excessive demand for tissue change.

The first point, then, that should be considered in choosing a climate for a tuberculous patient is his ability to respond to the demand for tissue change which will be made by such climatic change. This point must be determined upon regardless of the question as to the adaptability of high altitude to the treatment of tuberculosis.

For many years high altitude was considered to be an essential in the treatment of tuberculosis. This opinion was due largely to the statements of Dr. Archibald Smith, who wrote in 1840 that in the Peruvian Andes immunity from tuberculosis was commonly observed at an elevation of 7,500 to 8,500 feet. This was very evident, because in the cities at

lower altitudes and at the base of the mountains tuberculosis was rife. This same apparent immunity was noted in the Rocky Mountains and also in the Alps. The natural conclusion is that high altitude confers immunity. This was honestly believed for many years.

Other observations, however, were made, which cast some doubt upon the supposed immunity being due to the altitude *per se*. It was found that the steppes of Tartary, some portions of which are below sea-level, and the great desert of the south-west in America, portions of which are also below sea-level, likewise share this apparent immunity from tuberculosis. This forced the conclusion that it is not altitude *per se* but certain conditions which exist in common between high altitude and these great desert regions which causes this apparent immunity.

If we stop to enquire what these conditions are, we note that both have : (1) A sparse population ; (2) a great amount of sunshine ; (3) a pure air with low bacterial content.

When we consider that these are the conditions which are favourable to the prevention of the spread of tuberculosis, we can readily explain why tuberculosis does not exist to any extent in such regions. Tuberculosis is a disease which is most rife where overcrowding exists. It is particularly a disease of cities, and especially prevalent among the poor. Sunlight is the greatest enemy of the bacilli and our most reliable prophylactic, consequently we would not expect tuberculosis to spread very rapidly in these sparsely populated districts, which have a maximum of sunshine.

The votaries of high altitude have endeavoured to explain its benefits in the treatment of tuberculosis as being due to things which are not found in common with low altitude, and they have almost invariably used the damp lowland climates in the comparison. Consequently, they claim that the value of high altitude is due to lowered atmospheric pressure, a greater diathermacy, an increased electric tension, dryness of the atmosphere, and a great amount of sunshine. Granting that these are the elements of value, they are all present, except the first, in the low altitudes possessing dryness of atmosphere ; consequently this supposed advantage must be

due either to lowered atmospheric pressure or to some new reason not yet made known, or we must accept the conclusion that high altitude is not an essential to the treatment of tuberculosis.

Now let us examine the other side of the ledger and see if there are any reasons why high altitude is contraindicated in the treatment of tuberculosis.

In the first place, high altitude treatment is contrary to the principle of rest in inflammations in general and in tuberculosis in particular. The accepted principle of treatment in tuberculosis is rest, and it is employed whenever possible, so it is well to stop and enquire whether or not we should make an exception in case of the lung, and, if so, why so ?

That high altitude causes greater activity on the part of the lungs and throws great strain on the heart, which is already severely taxed, is an accepted fact, and one which cannot be ignored in the discussion of this subject.

That rest is the better method of treatment of pulmonary tuberculosis is also suggested by the observation which I have made repeatedly with reference to that portion of the lung which immediately surrounds the heart. When this part becomes seriously affected, especially on the left side, where it receives the greatest impulse of the heart-beat, it is very slow at healing. I believe that the proper explanation of this fact is associated with the constant motion of the part owing to the action of the heart.

Another point relative to the employment of high altitude is the condition of the patient. It seems unreasonable to place an individual who is deprived of a portion of his aerating surface under conditions where he is subjected to a natural demand for more respiratory effort, and one whose heart is undergoing an extra strain under circumstances where it will be subjected to more strain. It also seems unreasonable to place one who is suffering from the severe bodily drain incident to tuberculosis, whose vitality is lowered, and whose bodily functions are interfered with, in such conditions as to be called upon for an exaggerated tissue change, such as is required to meet the demand which is made by a high altitude. This consideration calls in question the

advisability of sending those who have advanced lesions to a high altitude, and suggests that if a high altitude is the best place for treating tuberculosis, only those who have slight lesions should be chosen for such treatment. Further consideration would also suggest another important limitation, that is, of early cases, only those should be sent who are able to meet the extra demand made upon them by the climatic conditions found.

Another important point in the treatment of tuberculosis is the after-result. It has long been noted that patients who secure an arrestment of their trouble at high altitude must remain there afterwards. It seems to me that the explanation of this might be suggested by another observation which is common to men who see many cases of tuberculosis, that is, that tuberculosis is common among athletes. It seems to me that the reason for this lies in the overstraining. Athletes are subjected to more or less constant strain. Their heart and lungs over-develop to meet the extra burden thrown upon them. They become larger than is necessary to carry on the usual work associated with the ordinary duties of life. When they leave the athletic field and settle down to the usual routine of life they are at a disadvantage. They have more lungs and heart than they need. Nature attempts an adjustment. A retrograde process supervenes, the organs become more or less flabby and become less resistant. That this is probable we may infer from our observations on muscles which have been over-developed and then subjected to disuse.

When one becomes adjusted to a high altitude the heart and lungs increase in size just as those of the athlete, and when he returns to the low altitude his heart and lungs must undergo a readjustment—a retrograde process must take place. In the case of tuberculosis it is probable that during this time the tissues are not so resistant as usual, and that the patient, unless his process has attained complete healing, is prone to have renewed activity in the old process.

From these observations I am led to the conclusion that high altitude is not an essential in the treatment of tuberculosis, and that the great majority of cases can be treated to best advantage at low elevations.

THE BLOOD PRESSURE AS A GUIDE IN THE TREATMENT OF HÆMOPTYSIS.

By EDWARD O. OTIS, M.D.

BOSTON.

IN the treatment of no symptom or complication of disease does that old aphorism of Hippocrates, "Experience is fallacious and judgment difficult," seem so true as in that of hæmoptysis. Consider the differing opinions and experience of so many and keen observers from almost time immemorial to the present day, and still the treatment continues to be largely empirical. More particularly does this Hippocratic maxim seem true with regard to the use of ergot. Were such experienced clinicians and careful observers as Wilson Fox, West, Ransom, Cornet, and many others, entirely deceived in their opinion and experience as to the value of ergot, or, as I am inclined to believe, did they not meet with apparent success sufficient to warrant their conclusions? Still we must admit, as Fowler observes, that "in the great majority of cases of hæmoptysis with a limited area of disease the bleeding ceases spontaneously provided the patient keeps absolutely quiet and observes the ordinary rules which prudence suggests," and therefore, he continues, "it is obvious that under such circumstances any remedy which is given sufficiently often may obtain an undeserved reputation." And this may be as true of the nitrites, now a popular remedy through the writings of Hare and others, as of ergot.

Hæmoptysis is a symptom dependent upon many and varying conditions—conditions difficult, if not impossible, to determine in every case. We have the underlying cause, the local process, its activity, degree of softening, and the state of the blood vessels in the diseased area; we have the individual diathesis; we have the various exciting causes—the activity of the circulation or blood pressure, the state of the nervous system, exercise, metabolic activity, mental excitement, causes dependent upon the sexual system, cough, and doubtless many others. It is, therefore, obviously

extremely difficult to judge of the effect of any remedy, or to administer it with precision ; and, indeed, one despairs of ever arriving at any great accuracy in the treatment of this symptom, and congratulates himself that in so many cases it ceases without treatment.

In what I have to say in these notes regarding hæmoptysis I do not include those cases of overwhelming and fatal hæmorrhages, obviously due to the rupture of an aneurysm in a pulmonary vein, for no treatment in such catastrophes is of avail. I refer rather to the less severe cases occurring generally in the earlier stages of the disease, and particularly to those which are recurrent or persistent.

Of late years, since the sphygmomanometer has come into use, the blood pressure as a causative factor in hæmoptysis has been receiving renewed attention, although the older writers were not unmindful of this factor, as witness Flint, who says : "There is a marked difference in different cases with regard to the activity of the circulation, or, to speak more definitely, of the heart, as represented by the character of the pulse." And Wilson Fox, who says, in referring to the use of ergotine : "It is a remedy which should be used in severe and intractable cases attended by a *soft* and *rapid* pulse," or, as we should say now, a low blood pressure.

Lawrason Brown read last year a very suggestive paper before the National Association for Study and Prevention of Tuberculosis upon "The Treatment of Hæmoptysis by the Nitrites, Based on Observations of Blood Pressure," and Hare,¹ of Australia, in various papers, speaks enthusiastically of his success, and that of others, with nitrite of amyl in hæmoptysis, based on the well-known action of this drug in producing a marked and rapid fall of blood pressure.

Hare evidently assumes that every case of hæmoptysis results from a comparatively increased blood pressure, and reports sixty cases from his own practice and that of others in which nitrite of amyl was used, and in which, with one

¹ *The British Journal of Tuberculosis*, vol. i., No. 1, p. 55.

partial exception, he says: "The bleeding ceased or became reduced to a mere staining of the sputa immediately—that is, within a minute or so."

From our experience at the Massachusetts State Sanatorium, I think we can offer other exceptions to accompany this single lonesome one of Hare's. Inspired by these reports, as well as actuated by the desire to see if we could obtain further light upon the value or worthlessness of ergot in hæmoptysis, we began about a year ago to take the blood pressure in cases of hæmoptysis occurring at the Sanatorium, and so far as we were able; guide our treatment by the indication thus given.

A Janeway's sphygmomanometer with the wide cuff was employed and the nurses instructed in its use.

As hæmoptysis is such an alarming symptom, and so often occurs without warning, our first effort was to stop the hæmorrhage, and our blood pressure observations had, necessarily, to be more or less of a secondary matter. Furthermore, the majority of cases occurred in the night or early morning when the physician was not on hand to make or verify the observations or direct the treatment, so that the nurse at the inception of the hæmorrhage followed the routine treatment, consisting of cracked ice, a small or large dose of morphia and atropine hypodermically according to the urgency of the case, and the inhalation of nitrite of amyl if it seemed to be indicated. Occasionally only cracked ice was given as a placebo.

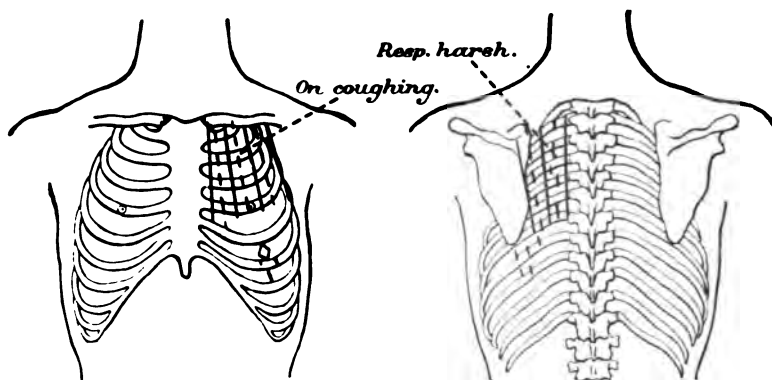
I have, however, eighteen cases, mostly recurrent, to report in which the blood tension was taken at or as soon as possible after the hæmorrhage began. In most of them, besides the immediate routine treatment above mentioned, if that did not suffice, either the nitrates or ergot was employed, depending upon the blood pressure; if this was comparatively high the former was given, and if low the latter, whose physiological action, as we know, is an "increase of blood pressure in the aortic system by a contraction of the arterioles through stimulation of the vaso-motor nerves" (Babcock, Kobert H.); and also as Jacobi (quoted by Cushny)

has shown, by direct action on the muscular wall of the vessels.

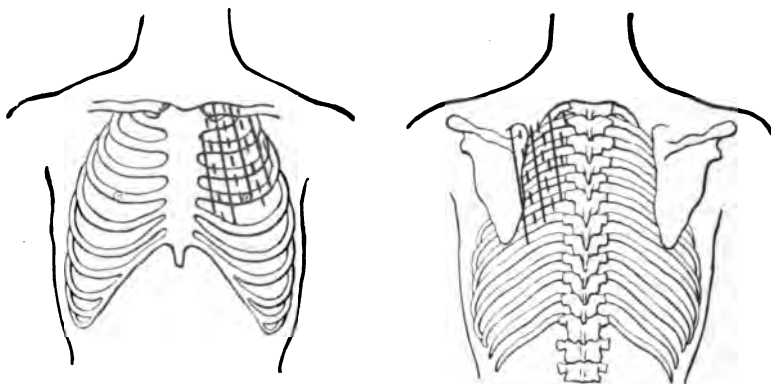
Hence if ergot is of value, it would seem to be obviously so in a condition of lowered blood pressure when the hæmorrhage might be considered to be more of a passive than an active one; and Babcock ("Diseases of the Lungs"), though he decries the use of this drug, very logically says: "If hæmoptysis were in every instance due to relaxation and transudation, ergot might do good." Our reasoning was that if the blood pressure will enable us to determine these exceptional cases in which the hæmoptysis is due to relaxation, why may not ergot be a rational indication in continued and recurrent hæmorrhage (for the action of ergot is too slow to produce immediate results), and may not the success attributed to its use have occurred in just such cases? In a number of cases, whatever the blood pressure, if the indicated drug (by the blood pressure) appeared to exercise no beneficial influence upon the hæmorrhage we tried that contra-indicated by the blood pressure, and apparently sometimes with success.

In order to obtain what might be considered a standard of blood pressure among tuberculous individuals it was taken in 320 cases in the Sanatorium, and the average was found to be 124 M.M., Hg. Of the men it was 128 and of the women 115. Of 42 male patients the average blood pressure was 126, the highest 140, and the lowest 100. Of 43 female patients the average was 120, the highest 132, and the lowest 98. We therefore considered 126 M.M. as the average blood pressure in tuberculous persons.

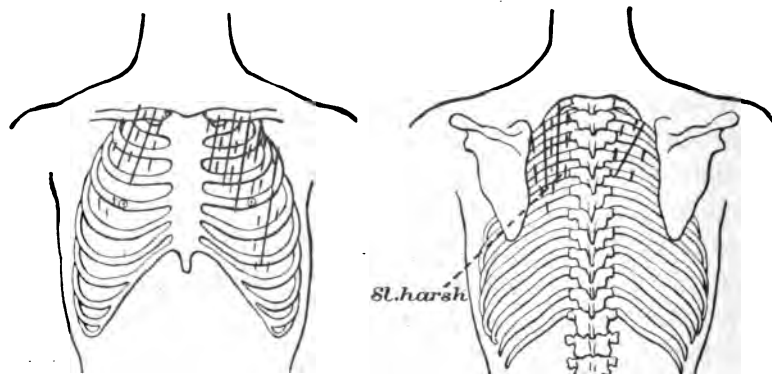
It must be remembered that the ordinary method we have of measuring the arterial blood pressure is not of precise accuracy, and apparently slight influences, such as mental excitement, physical exertion, the process of digestion, &c., cause it to vary considerably within certain limits. In the cases herewith given, for example, this variation is seen to be quite extensive. It is well to take the pressure several times at intervals in order to obtain a fair approximation of the real tension.



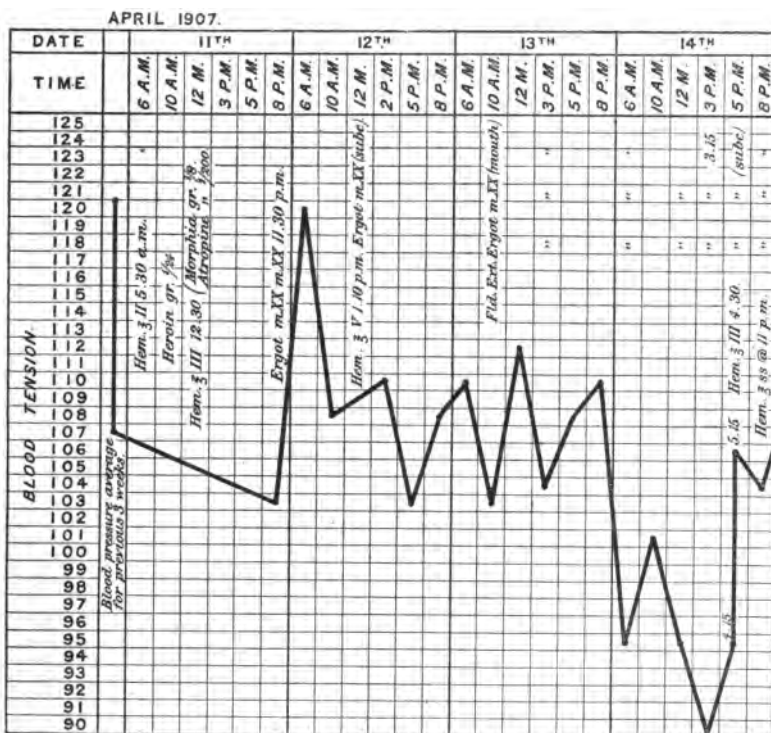
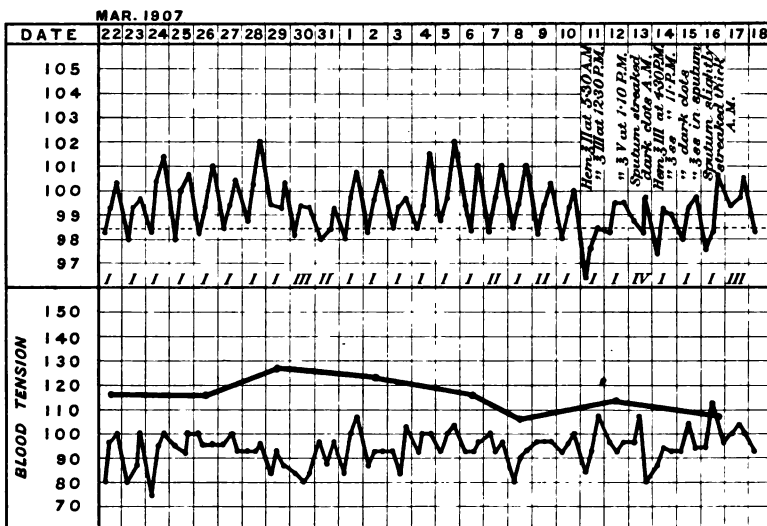
October 25, 1906.



January 10, 1907.

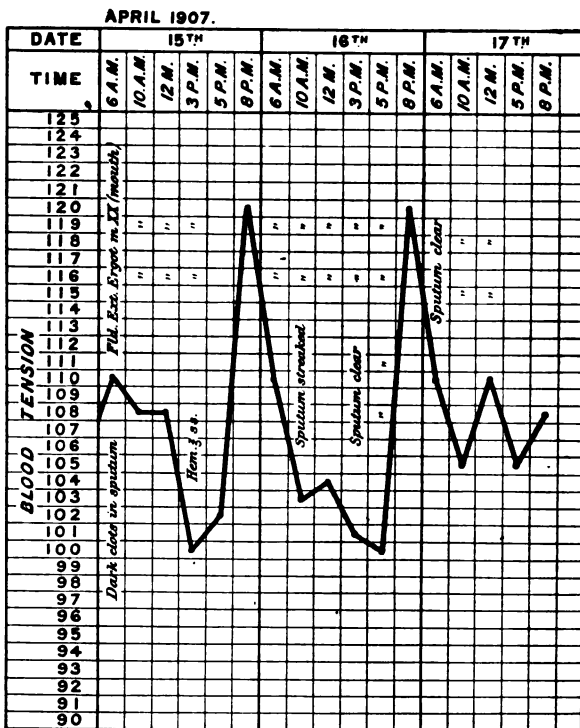


February 21, 1907.



In the eighteen cases of hæmoptysis with the blood pressure herewith given, it is seen that the majority of them are below our average blood tension—126—some of them markedly so. The highest was 145 and the lowest 74; the average was from 109 to 119.

In nearly all the cases, when any treatment was considered necessary, the routine one before mentioned was at first



Flu. ext. ergot (Wyeth's) purified for hypodermic use. Only ergot used.

employed, namely, ice, morphia combined with atropine, or heroin, with or without nitrate of amyl, depending upon the rapidity and amount of the hæmorrhage. On the recurrence or persistence of the bleeding, either ergot or the nitrates, in the form of nitrate of sodium or nitroglycerine, were then tried, depending upon the blood pressure. If one of these two

drugs did not appear to produce results, given according to the indication of the blood pressure, the other was exhibited, whatever the blood tension might be. Both in certain cases seemed apparently effective, and both in others ineffective.

The histories and charts of individual cases herewith presented illustrate the varying treatment based upon the blood pressure, and the apparent results of the same. They also show how extremely difficult it is to estimate the effect of any one drug given for a symptom-complex caused by so many and varying conditions, and they would also seem to indicate that the blood pressure, though of value as a guide, is by no means an infallible one; a conclusion which we should expect, for the tension is only one of the factors in this complex symptom.

These observations are not, I am aware, perfect, and may seem conflicting; they are but suggestive. I trust, however, that they may throw some light upon the subject and indicate a little more definitely the path of treatment. I would suggest that the blood pressure should be taken of every sanatorium patient, since it can so readily be done in an institution as a part of the routine. We would then have this observation already at hand as a guide whenever a hæmorrhage did occur. In one of the histories presented it will be seen that this was done. It will be noticed in this case that a fall in tension preceded the first hæmorrhage. One can draw his own conclusion as to the effect of ergot (which was used in this case continuously for several days) upon the blood pressure and upon the hæmorrhage, and the relation of the one to the other.

I have referred to our experience, which is similar to that of others, that in the majority of cases the hæmoptysis occurs at night, or in the early morning hours. In eleven out of sixteen of the reported cases it will be seen that this happened. This fact throws some light upon the cause of the hæmorrhage, and at the same time gives us a hint as to treatment. It would appear to indicate that the blood pressure and sudden variations in pressure were a causative factor. Law-rason Brown thinks that Howell's theory of sleep offers an

explanation of this; Howell's theory being, in brief, that sleep is due to the fatigue of the vaso-constrictor centre, and, in consequence, there is a dilatation of the peripheral vessels, when in the early morning hours the vaso-constrictor centre is regaining its lost tone, variations in blood pressure result. To prevent this variation and equalise the blood pressure, Brown gives morphia and sodium nitrate between midnight and 2 a.m. It will be noticed that calcium lactate or the chloride was employed in several cases, on the coagulation theory. The cases are too few, however, to draw any definite conclusions, but my feeling is that this treatment is of small value.

Epsom salts are frequently used in our service and with apparent benefit, probably, as Babcock says, on account of the favourable effect of a laxative upon the "pulmonary circulation through stimulation of the splanchnic nerves, which are known to regulate blood pressure throughout the body."

Aconite has also been employed, but I need further experience to judge of its value.

In conclusion: From the experience in these reported cases and from our general experience I would suggest a plan of treatment of hæmoptysis somewhat as follows—provided of course, that any active treatment seems indicated. First a knowledge of the blood pressure of the patient from previous observations. On the occurrence of the hæmorrhage, ice, morphia and atropine subcutaneously, and, depending upon the amount and rapidity of the hæmorrhage, the inhalation of nitrite of amyl. A laxative dose of sulphate of magnesia, and, if the bleeding persists or is recurrent, nitrite of sodium or nitro-glycerine if blood pressure is high for the individual, or, if low, ergot or ergotine subcutaneously.

I am quite well aware that when I suggest the use of ergot I am preaching heretical doctrine, but in our experience it has apparently proved itself of value in at least a few cases when other remedies have failed.

I have to express my obligations to my resident physicians

at the sanatorium, Drs. Dunham and Crane, who have conducted the detail of these observations and to whose experience and suggestions I am greatly indebted.

CASES OF HÆMOPTYSIS AT MASSACHUSETTS STATE SANATORIUM.

Time of occurrence	Amount	Blood pressure	Treatment	Results
(1) 3 a.m. ...	Æiii., later Æii. or Æiii.	110 mm. hg.	No treatment at first; calcium lactate subsequently	First hæmorrhage ceased; small hæmorrhage later and streaked sputum.
(2) Night ...	Æii. first day, Æiii. second day	116 at first; later period 102 to 122	No treatment...	Two small hæmorrhages only on two successive days.
(3) 2.15 a.m....	Æiii.ss. ...	104 at 10 a.m.; 112 at 6.15 on the next day	Heroin and cracked ice	Apparently ceased.
(4) About 4 p.m. and in night	Æi. twice two successive days and clots	100 to 120...	Morphia or heroin during hæmorrhage; ergot later	Clots continued about 12 days; <i>no increase</i> of blood pressure under ergot.
(5) Not given...	Æss. to Æv. on two successive days	112 to 154...	Nitrites, calcium chloride, codeia	Apparently ceased on second day.
(6) Early morning and during day	From Nov. 25 to Dec. 11, Æxliiii.	94... ..	Morphia, atropine, nitrites, ergot for several days	Ergot appeared to stop the hæmorrhage (see chart).
(7) 9 a.m. and 8.45 p.m.	Æiii. and Æi. ...	126 following day; in 6 days later 88	Morphia, atropine, heroin, ice, magnesia, sulphates	Apparently ceased.
(8) Not recorded	Æii. to Æiii. on two succeeding days, streaks	112 to 120...	Not recorded...	Not recorded.
(9) Early a.m. and p.m.	Æx. to Æviii., various days	85 to 98 ...	Heroin, morphia, atropine, nitrites, ergot	Ceased, then recurred. Advanced case; died from sepsis.
(10) 1.30 a.m. ...	Æss. to Æii., recurrent	74 to 98 ...	Ergot, ice ...	Raised blood almost daily for 19 days.
(11) a.m. and p.m.	Æi. to Æiv., recurrent	110 to 120...	Morphia, atropine, nitrite of amyl	Apparently ceased; slight spitting subsequently.
(12) 4 a.m. and 3 p.m.	Æiii. and Æiv., recurrent over many days	130... ..	Morphia, atropine, Epsom salts, nitrites, ergot	Recurrent for days (see chart).
(13) Night and p.m.	Æss. to Æii.ss., recurrent	120 to 130...	Heroin, Epsom salts	Ceased in a few moments, followed by clots.
(14) 9.20 p.m....	Æss.	119... ..	Heroin ...	Ceased at once, followed by clots.
(15) p.m. ...	Æi. to Æss., recurrent	130... ..	Nothing at first, ergot later	At once; recurred at once.

CASES OF HÆMOPTYSIS.—*Continued.*

Time of occurrence	Amount	Blood pressure	Treatment	Results
(16) Early a.m. and p.m.	℥ii. to ℥xv., over many days	120 to 135 before nitrites, 115 after	Morphia, atropine, ice, nitrites, calcium chloride, aconite, salts	Ceased after nitrites and aconite (see chart).
(17) a.m. and p.m.	℥ss. to ℥iv., recurrent and persistent, streaks	113 to 145...	Morphia, nitrites, finally ergot continued	Gradually ceased after ergot (see chart).
(18) Early p.m.	℥ss. to ℥iii., recurrent, streaks	90 to 125...	Morphia, atropine, ergot	Apparently ceased after ergot, until blood pressure fell again.

Obituary.

DR. JAMES A. HART, of Colorado Springs, presented the following memoir of Dr. S. E. Solly¹ :—

Dr. Samuel Edwin Solly was born in London, England, May 5, 1845. His father, Dr. Samuel Solly, was a distinguished London surgeon and Fellow of the Royal Society, also an author of numerous scientific articles. Dr. Solly acquired his early education at Rugby and his medical training at St. Thomas's Hospital Medical College. He graduated in 1867 at the Royal College of Surgeons, London. He began the study of climatic treatment of pulmonary diseases at the early age of 18, when he was forced by a break-down in health to travel in Egypt, the Riviera and Switzerland. Since that time he has visited nearly every important health resort in Europe and America, personally inspecting most of the public and private sanatoria for the treatment of tuberculosis. His intimate acquaintance with specialists on tuberculosis, who held him in high esteem, was unusually large. Through association with his father he had unusual opportunities of coming in touch with the leading laryngologists and specialists of the day in England. At the age of 30, owing to another breakdown in health, he came to America, and in 1874 established himself in Colorado Springs, where he immediately continued his investigations as a climatologist. His researches in this branch are well known to the profession generally, not only in this country but also in Europe.

His articles embrace "Tubercular Laryngitis," "Temperament," "Relation of Nasal Disease to Pulmonary Tuberculosis," "The Influence of Altitude upon the Blood," and numerous medical essays, which have been presented to the various societies of which he was a member.

¹ American Climatological Association, Annual Meeting at Washington, D. C., May 7, 8 and 9, 1907.

After years of careful personal investigation and travel he published the "Handbook of Medical Climatology"; this work is familiar to all members of this Society, and is considered an authority by the profession generally. Dr. Solly was a Fellow of the Royal Medico-Chirurgical Society of London, ex-President of the American Climatological Association, of the American Laryngological, Rhinological and Otological Society, Colorado State Medical Society and the El Paso County Medical Society. He was a Director of the National Society for the Study and Prevention of Tuberculosis, a Member of the Social Science Association, a Fellow of the Washington Academy of Sciences, and a Member of the American Medical Association. At the time of his death he was the Treasurer of the Colorado State Medical Society. He had been a number of times President of the El Paso County Medical Society and was one of its founders. Dr. Solly was an early member of the American Climatological Association, served many years in its Council and was President in 1895. It was in this society that he took the greatest pride. During his membership he never neglected his duties unless absent from the country or detained by illness. He always had something of interest to present, and his remarks were interspersed with the humour that was so natural to him. As he loved our Society, so did we love him. My own relations with him were of such an intimate nature that the presenting of this inadequate notice is to me peculiarly difficult. When I went to Colorado Springs in 1876, an entire stranger and broken down in health, he was one of the first to meet me and extend that hospitality for which he was so noted. Our friendship was of such a nature that it was my privilege to have opportunities of knowing of numerous acts of charity which he was constantly engaged in. Never did he neglect to show the same delicate attention to his impecunious patients that he showed to the more fortunate. He was always the true Christian gentleman.

Dr. Solly was a worker, not only in his profession, but in every enterprise requiring public spirit. He became interested in Colorado Springs as a health resort at once upon his arrival there, and from that time was identified with every important

event of state or city. He was foremost in the promotion of the Antlers Hotel; a founder, and for many years President, of the El Paso Club, and was senior warden of St. Stephen's Episcopal Church from the time of its organisation.

Undoubtedly Dr. Solly's life was shortened by his devotion to what he called his "pet scheme," that of establishing a sanatorium for the treatment of tuberculosis in Colorado Springs. This had for many years been his hobby. Although he did not live to see his ideal realised, he did see the establishment of the Cragmore Sanatorium in successful operation before his death.

Regarding Dr. Solly's private life, I can probably offer no better tribute than to quote from the *Colorado Springs Gazette*: "In private life Dr. Solly was one of the most delightful companions. Well informed on an exceedingly wide range of subjects, fluent in conversation, quick in apprehension, witty in his terms of speech, he was many times the life of the company in which he sat. As an after-dinner speaker and as a toast master he had no equal, and one reason why his more solid addresses were so well received was because they were illuminated with humour. The state of his health for a few years prevented him from taking a prominent part in social life, but, up to that time, he was one of the most delightful of guests and the most charming of hosts."

By his death our association has lost one of its most active and distinguished members, a loss not only to the society, but to each individual member.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY

GENERAL MEETING,

Held at 20, Hanover Square, W., on Wednesday, October 30, 1907, at 5.30 p.m., the President, H. SHIRLEY JONES, Esq. (Droitwich), in the chair.

The Minutes of the last meeting were read and confirmed.

The Treasurer, Dr. HARRY CAMPBELL, explained the balance sheet, which was adopted.

Mr. Shirley Jones then vacated the chair, which was taken by the new President, W. J. Tyson, Esq., M.D., F.R.C.P., F.R.C.S. (Folkestone).

Dr. LEONARD WILLIAMS proposed, and Dr. STREET (Westgate) seconded, a vote of thanks to the retiring President, Mr. Shirley Jones, who returned thanks.

Dr. COWAN (Bath) proposed, and Dr. GARDNER (London) seconded, a vote of thanks to the officers and Council.

Dr. FORTESCUE FOX and Dr. SOLLY (Harrogate) replied.

ORDINARY MEETING,

Held at 20, Hanover Square, W., on Wednesday, October 30, 1907, at 6 p.m., the President, Dr. TYSON (Folkestone), in the chair.

The Minutes of the last meeting were read and confirmed.

The following candidates were elected by ballot :—

T. W. Newton Dunn, M.A., M.B., B.C., M.R.C.S., L.R.C.P., Bath.
Thos. Edwyn Cecil Cole, M.A.(Oxon.), M.D., Leamington.
Alfred E. Boyd, B.A.(Dub.), M.B., B.Ch., B.A.O., D.P.H., Dublin.
Conwy Llewellyn Morgan, M.B., B.S., Droitwich.

The following candidates were nominated for ballot at the next meeting :—

Alexander Cecil Gurney, M.B. (Lond.), L.R.C.P., Eastbourne.
J. L. Irwin Moore, M.B., C.M.(Edin.), London.
Richard Ackerley, M.B., B.Ch.(Oxon.), Llandrindod Wells.
Matthew Burrow Ray, M.D.(Edin.), Harrogate.

Dr. BAGSHAWE (St. Leonard's) then invited the President to deliver his address.

The PRESIDENT then delivered his address, entitled "Some Thoughts about our Society and its Work."

Dr. BAGSHAWE proposed, and Dr. EWART seconded, a vote of thanks to the President for his address, which was supported by Dr. MAHOMED (Bournemouth).

The PRESIDENT returned thanks.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

ANNUAL BUSINESS AND ORDINARY MEETINGS,

Held in the Rooms of the Royal Society of Medicine,
20, Hanover Square, London, W., on Wednesday, October 30,
1907, at 5.30.

BUSINESS MEETING. Dr. SHIRLEY JONES in the Chair.

The PRESIDENT moved that the Balance Sheet be adopted.
Dr. LEONARD WILLIAMS seconded, and it was agreed to.

THE TREASURER'S REPORT.

Dr. HARRY CAMPBELL (Treasurer) reported that the Society had a balance of assets over liabilities of £34 11s. 3d. That, however, was on the assumption that all the assets were secure. The principal asset was a sum of £150, arrears of annual subscriptions, and he feared that the whole of that would not be forthcoming, in which case it was doubtful whether the Society was solvent. Perhaps he was largely responsible for that large amount, but he had sent out one or two whips. He would redouble his efforts. He thought the Society ought to have a sinking fund of a hundred pounds or so to fall back upon.

RETIREMENT OF Dr. SHIRLEY JONES AS PRESIDENT.

Dr. SHIRLEY JONES said that as his term of office as President had now come to an end, it was his pleasing duty to give place to a gentleman who needed no introduction to members of the Balneological Society. Dr. Tyson, of Folkestone, had been, from the inception of the Society, a very able and willing worker, and under his guidance he was sure the work which the Society was doing would be very much enhanced.

Dr. TYSON then took the Chair.

Dr. LEONARD WILLIAMS said it was with great pleasure he proposed a vote of thanks to the outgoing President, Dr. Shirley Jones, who had done his work, as it was known

THE BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.
BALANCE SHEET FOR THE SESSION ENDING SEPTEMBER 30, 1907.

RECEIPTS.		PAYMENTS.	
	£ s. d.		£ s. d.
To Bank Balance, Sept. 30, 1906	... 63 12 2	By Secretary's Petty Cash to Sept. 30, 1906	... 8 15 2
Subscriptions received for the year 1906—1907	... 131 5 0	Editor's Clerk	... 10 10 0
as arrears owing prior to Oct. 1, 1906	... 3 3 0	Printers' (Bale & Sons) on Account	... 80 0 0
Advertisement in Journal	... 2 11 0	Cash credited (Bale & Sons) being monies received by them on account of Sale of Journal	... 5 3 6
Sale of Journal (Bale & Sons)	... 5 3 6	Miss James' Account, Indexing Journal	... 6 18 0
		Rent, 20, Hanover Square, to Sept. 30, 1906, in advance	... 10 10 0
		Porter	... 1 0 0
		Reporter to Sept. 30, 1907	... 10 12 0
		Medical Directory	... 0 11 6
		Returned Subscription, Dr. Sandwith	... 0 10 6
		Wreath, Dr. Symes Thompson	... 0 15 0
		A. Viner, Commission Account re Advertisements	... 2 0 0
		" Clerical Work and Expenses for Treasurer	... 4 19 2
		Newton & Co., Lantern Hire	... 1 10 0
		Bywaters & Sons, Tarpaulin Hire	... 0 10 0
		Bankers' Charges	... 0 0 2
		Balance at Bank, Sept. 30, 1907	... 61 9 8
	<u>£205 14 8</u>		<u>£205 14 8</u>
LIABILITIES.		ASSETS.	
	£ s. d.		£ s. d.
To Secretary's Petty Cash to Sept. 30, 1907	... 7 17 8	By Subscriptions in arrears, Sept. 30, 1907	... 150 13 6
Editor's Clerk	... 10 10 0	Cash for Advertisements	... 23 8 0
Rent, 20, Hanover Square	... 15 15 0	Estimated proportion of Income from Advertisements up to Sept. 30, 1907	... 9 10 0
Printers' Journal Account	... 123 12 2	Balance at Bank, Sept. 30, 1907	... 61 9 8
General	... 47 19 0		
A. Viner, Commission on Advertisements	... 4 3 6		
" Expenses Account re Advertisements	... 0 12 7		
Balance, being excess over liabilities	... 34 11 3		
	<u>£245 1 2</u>		<u>£245 4 2</u>

Audited and found correct.
HENRY MCCLURE.
J. T. GARDNER.

he would, with energy and efficiency. He recalled to the memory of the Fellows Dr. Shirley Jones's particularly efficient behaviour on the occasion of the Society's visit to St. Leonards. The kindness and dignity with which he conducted the affairs of the Society on that occasion would remain in the memory of all who witnessed it, especially on the occasion of the visit to Battle Abbey. Without in any degree impinging on what was due to Dr. Tyson, it could be truly said that they were all very sorry that Dr. Shirley Jones's term of office had come to an end.

Dr. STREET seconded the vote. Dr. Shirley Jones had had the advantage of being known to the Society by his previous work for it, he having been for several years one of the Honorary Secretaries. Members might congratulate themselves upon having had a particularly happy exposition of how the duties of President ought to be carried out. Dr. Leonard Williams had referred to St. Leonards, and he (Dr. Street) would refer to Droitwich. Throughout his term of office Dr. Shirley Jones had been entirely efficient and entirely unassuming.

The resolution was carried by acclamation.

Dr. SHIRLEY JONES, in reply, tendered his hearty thanks for the kind vote of thanks which had been passed, though he felt diffident in taking all those flattering terms to himself. He had had an extremely pleasant year of office, and if he was able to say that the work of the Society had not been in any way hindered during his term he would feel content. He looked upon the meeting at Hastings and St. Leonards as one of the most pleasant he had ever attended, but he could not admit that the success of that meeting was enhanced by his presidency over it. If there had been any value attaching to his presidency, it had been in large measure due to the officials of the Society, to whom he took the opportunity of tendering his heartiest thanks, especially mentioning Dr. Sunderland. In a nice, quiet, and unostentatious manner Dr. Sunderland had helped him on every possible occasion, as indeed he had helped every one who belonged to the Society.

THANKS TO THE COUNCIL AND OFFICERS.

Dr. COWEN (Bath) proposed a hearty vote of thanks to the Officers and Council of the Society with great pleasure.

Dr. GARDINER (London) seconded, and it was carried unanimously.

Dr. FORTESCUE FOX, replying on behalf of the Officers of the Society, tendered his thanks for the way in which the meeting had received the vote. He looked upon it as a real honour to still belong to the Society in an official capacity, though he admitted that his function was a somewhat shadowy one. Still, in the future he hoped it might be less shadowy. The Officers must all feel great pleasure in contributing, in however small a measure, to the prosperity of the Society, though, as a London member, he felt that his place should be secondary to that of Provincial Fellows.

Dr. SOLLY responded on behalf of the Provincial Fellows. He said the Provincial members might not feel that they were the backbone of the Society, but they formed the rest of the body, and a very united body. While looking to the London Fellows to carry on a great deal of the centralised business, he thought the Provincial Fellows must do a little more in carrying out their functions and adding to the number of members, especially after hearing the Balance Sheet. The merits of the Society should be better known among the Provincial practitioners, for whom it was originally founded to gather and present knowledge. He had always maintained that London was a health resort, but had never gone so far as to call it a spa.

ORDINARY MEETING.

The Society then formed itself into an ordinary meeting, Dr. TYSON occupying the Chair.

PRESIDENTIAL ADDRESS.

Dr. TYSON then delivered his Presidential Address (*vide* p. 1).

Dr. BAGSHAWE, J.P., proposed a hearty vote of thanks to the President for the address he had delivered, in which he had referred to many things which touched very nearly the

members of the Society. Dr. Tyson had shown how the physician's advice to the patient should be founded on general knowledge, a point which could not be too much emphasised. He had wisely said, it should be the part of those who belonged to that Society to take not only a general survey, but an individual survey, of the groups of climates to which they thought well to send their patients. He agreed that they should not be satisfied with simply reading up the subject, and then saying to the patient that his disease was labelled so and so, and therefore he must go to such and such a place. It was necessary to take in every factor of a case, and that could only be done by personal knowledge of the different spas and watering places and climatic resorts. He (Dr. Bagshawe) had gone on the same principle, and he thought there were large numbers of such groups of places. He had visited the West and South of France, Italy, Germany, and other places, and he had found the information so acquired extremely useful during his somewhat long experience. He had been to some thirty or forty places abroad, and he believed there were but few places in England which he had not visited. It was only on full information that the physician could advise his patients. The President had touched on the danger of patients travelling. During the three or four years which he (Dr. Bagshawe) spent at Mentone he had reason not to think exactly as Dr. Tyson did. He had a talk to Dr. Bennett there, who said that during the first two or three weeks of the commencement of the season there was nearly always a crop of deaths, which he attributed to the result of the fatigue of travelling. Though the patient might get over the actual journey, exhaustion set in afterwards, and many deaths usually took place when phthisis cases were sent to that resort. Of course, journeys could now be performed much more easily, but he made the remark so that they should not be too confident that patients might travel because facilities for travel were so great. Other interesting topics touched upon included the position of the doctor in hotels at seaside places; they were very delicate matters, and might properly form the subject for discussion at some future meeting of the Society.

Dr. WILLIAM EWART seconded the resolution. He said he had derived much pleasure and instruction from the President's remarks, and had been able to recognise in them some latent thoughts. One which was of very great importance was the potentiality of the Society to become the oracle or source of information, or appeal for knowledge concerning all resorts, because the Society did not confine itself to British resorts. He hoped the Society would find means of giving practical effect to the suggestion. He felt sure all would join him in expressing thanks to the President for his interesting address.

Dr. MAHOMED supported the vote of thanks which had been proposed and seconded. All would agree that the President had approached the matter from a wise and common-sense point of view, which he would be glad to see more common among the heads of the profession. It has been said that the English medical man was a very good doctor, but there were two things which he did not understand—wines and spas. Though that was said a long time ago, he thought it still more or less true. It was interesting to consider how slowly they could mould public opinion. Those things had been talked of for years, but there had not been very much progress in arousing the interest of the bulk of the profession on them. He hoped the Society would in the future become more aggressive than it had been in the past, though he thought it would be a little difficult for the Society to become a consultative body to whom any one could apply; he did not see how there could be a focussed opinion on such a subject. But on such things as the ill-behaviour of electricians and masseurs at health resorts, the Society might well make a definite pronouncement. It was difficult to say how they should act, but in these days much might be done by union. He disliked trades unions, but there were some things which could be learned from them, such as self-denial, and devoting money to a common object. The Society could pass a self-denying ordinance, and act up to it, and publish a kind of profession of faith as to what was the proper ethical relation between the London consultant and the practitioner at the health resort; also what was to

be his attitude towards electrician touts and masseurs, and those hotel-keepers who recommended their own particular favourites.

The PRESIDENT expressed his warm thanks to all who had spoken in praise of his address, and said he hoped the Society would have many pleasant meetings during the coming Session.

The members then adjourned for dinner.

ORDINARY MEETING,

Held at 20, Hanover Square, W., on Wednesday, December 11, at 6 p.m., the President, Dr. W. J. TYSON (Folkestone), in the chair.

The Minutes of the last meeting were read and confirmed.

The following candidates were elected by ballot :—

Alexander Cecil Gurney, M.B.(Lond.), L.R.C.P., Eastbourne.

J. L. Irwin Moore, M.B., C.M.(Edin.), London.

Richard Ackerley, M.B., B.Ch.(Oxon), Llandrindod Wells.

Matthew Burrow Ray, M.D.(Edin.), Harrogate.

The following candidates were nominated for ballot at the next meeting :—

George Myrtle, M.R.C.S., L.R.C.P., Harrogate.

Frank Reginald Sawdon, M.B., Ch.B.(Victoria), Buxton.

John Nicholas Donnellan, M.B.R.U.I., B.Ch., B.A.O., Eastbourne.

Dr. EDGECOMBE (Harrogate) read a paper on "Blood-pressure in Spa Practice."

Drs. LEONARD WILLIAMS, G. OLIVER and H. CAMPBELL discussed the paper.

The discussion was adjourned until January 29, 1908.

Reviews and Notices of Books.

THE CAUSE AND PREVENTION OF BERI-BERI. By W. Leonard Braddon, M.B., B.S., F.R.C.S., State Surgeon, Negri Sembilan, Federated Malay States. London: Rebman, 1907. 21s net. Pp. 535.

THIS work consists chiefly of a report presented to the Colonial Office by the author in May, 1904, with many facts added from more recent publications. The Malay Peninsula is an excellent place for the study of this disease, so endemic in many parts of the Tropics, for more than one-fifth of all cases treated in the Government hospitals suffer from this complaint. The case mortality varies enormously : sometimes a hundred consecutive cases may be admitted, none of which are fatal. On the other hand, one hundred coolies imported in 1889 to work at a particular mine furnished ninety deaths from beri-beri within a year. It is always difficult to determine when the disease has already begun in any individual patient ; Dr. Braddon considers that the absence of perception of light cotton-wool touches over areas corresponding to the second and third sacral segments of the cord is one of the earliest signs, while languor, lassitude, general itching, dyspepsia, fatigue on slight exertion and tachycardia are among the earliest symptoms.

It has long been known that the Chinese, who lead relatively clean lives, furnish 96 per cent of the victims in the Malay States, while the dirtier classes, the Tamils, almost alone uniformly escape beri-beri. The author considers that the comparative immunity of the latter is due to their feeding chiefly on rice which is boiled and dried before it is milled. The Chinese live on what is called "uncured" rice, and so do we in England. But in all countries, including Japan, the sufferers are those whose chief article of diet is rice, and these eat every day from 1lb. to 1½lb. of dry rice. In the Japanese Army and Navy beri-beri constantly occurred when the ration consisted of 26 ozs. of dry rice every day and little else, but beri-beri was practically eradicated by Baron Ta Ka Ki from the Japanese Navy by improving the food of the sailors, adding meat and also barley in the proportion of three of barley to seven of rice. Dr. Braddon maintains that so long as a daily ration does not exceed 14 oz. of rice, and is not more than one third of the whole diet, no beri-beri will appear in healthy men, though a smaller quantity of rice may produce the disease in those who are already sick. One of the arguments against the rice theory of causation has always been that

beri-beri has occurred for half a century in Brazil, where rice is not grown, and is said not to be eaten. But he pertinently points out that in 1902 more than eighty-nine millions of kilos of rice were imported into that country, being almost enough to supply 500,000 men with 1lb. of rice daily for a whole year. He starts with several axioms to try and prove that every beri-beric in the East is an eater of rice, and that people who do not habitually eat rice never get beri-beri.

He argues by assuming that the "uncured" rice theory is correct, and then gives many facts to prove that it is so. His work is of great interest, his arguments are plausible and fascinating, and we must now wait to see whether the Commission sitting in the Malay States on the subject, will confirm his opinions. He maintains that so long as Europeans and Bengalis preserve their own national habits, they are completely exempt from beri-beri even when living in severe foci of that disease, but, on the contrary, when Europeans and Bengalis eat rice of an uncured sort for any length of time, they get beri-beri.

With regard to ship beri-beri, the majority of recorded epidemics on British ships occur among Lascar crews, whose rations consist principally of rice, which forms 53 per cent. of the total diet at sea and 43 per cent of it when in harbour. In northern latitudes, as Nocht has shown, most of the so-called beri-beri of ships is really scurvy and neuritis. All who are interested in this engrossing question should read Dr. Braddon's book without delay.

Notes and News.

HASTINGS AND ST. LEONARDS.

HASTINGS and St. Leonards have been favoured with mild weather and numerous visitors so far during the winter season. December was exceptionally mild and the sunshine record high, Hastings heading the list of towns with sixty-eight hours (London twenty-five hours).

January has been a mild month with only a short spell of frost and but little snow. The sunshine was 92·6 hours against average of 58 hours; on twenty out of the thirty-one days rainfall only 1·35 inches against average 2·70.

In 1907 the rainfall was below the average, namely 24·68 inches, hours of bright sunshine 1,804, mean summer temperature 60·3° F., and mean winter 40·1° F. Mean daily range 10·7°.

Death-rate was only 12·06 per 1,000, although swelled by patients arriving in bad health.

Socially the season promises to be most successful. There are plenty of amusements to choose from. The new managers of the Gaiety Theatre are to be congratulated on the fine plays and good companies they have provided, and the winter orchestra of the Borough Entertainments Association has been a most successful venture. The amateur orchestra is amalgamated once a week with professionals, forming a band of nearly fifty performers. It is to be hoped that the Town Council will provide a building which could be used all the year round as a kind of club and winter garden for residents and visitors, in which good music and entertainments could be provided in bad weather, after the style of the casinos at Continental health resorts. It would add greatly to the popularity and prosperity of the town.

TUNBRIDGE WELLS.

METEOROLOGICAL NOTES FOR JANUARY, 1908.

THE Jordon (Photographic) Recorder showed 77 hours 36 minutes of sunshine; the mean being 62 hours 23 minutes. The most in one day was 6 hours 48 minutes on the 18th.

There were nine sunless days. The Campbell Stokes (Burning Glass) Recorder showed 86·7 hours, with 7·1 hours on the 12th.

The greatest heat in the sun was 84·8° on the 17th, and in the shade 52·3° on the 27th. The lowest temperature, 4 ft. above the ground on Mount Ephraim, was 20·2° on the 12th; and on the grass, 13·6° on the 6th. The mean temperature for the month was 35·5°; the average being 37·5°. The mean daily range was 9·9°; and the mean difference between the wet and dry bulbs at 9 a.m. was ·9°. There were twenty-seven frosts on the grass and twenty-one in the air, the average being twenty-two and fifteen respectively.

The total rainfall was 1·91 in.; the average is 2·27 in. The most in one day was 1·36 in. on the 7th. It fell on fourteen days—eighteen being the average.

The mean amount of cloud at 9 a.m. was 6·8—10 representing overcast. There were four dense fogs, and it was foggy on one other morning.

AMUSEMENTS.

During the summer musical teas will be given every afternoon at the Opera House. The orchestra will be augmented, and bioscope pictures will be shown while tea is served.

Golf can be enjoyed by visitors staying at the Spa Hotel, which is beautifully situated on Rusthall Common, and has fine private grounds in addition to the golf course of nine holes. The Spa Hotel is very well warmed, has a good installation of baths of nearly every description, and is particularly suitable for convalescents. This hotel is under new management, and appears likely to become more and more popular.

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BLOOD PRESSURE IN SPA PRACTICE.

BY WILFRID EDGECOMBE, M.D., M.R.C.P.LOND., F.R.C.S.ENG.
Honorary Physician to the Harrogate Infirmary.

DURING the last few years a great deal of attention has been paid to the clinical measurement of blood-pressure as an aid to diagnosis, and as a guide to treatment. The appearance of new instruments, of ready portability, suitable for clinical use, and furnishing reliable results, has given an impetus to the study of blood pressure in physiological and pathological states, and thereby our knowledge of the subject has been considerably extended. Of such instruments there are several, both accurate and convenient ; the choice of one or another is largely a matter of individual taste. Among them may be mentioned the mercurial manometers of Riva-Rocci, Martin, Stanton, Janeway, Mummery ; the recording manometer of Erlanger, recently modified by Gibson to furnish an absolute record of blood pressure ; the compressed air spring hæmadynamometer, and the more recent compressed air manometer of Oliver. The instruments which I have mostly used are the Riva-Rocci mercurial manometer and Oliver's spring and compressed air manometers.

In ordinary general practice the systematic observation of blood-pressure is of service, and that not only in cases of obvious derangement of the circulatory system. In Spa practice so useful is the instrument that I have come to regard it as indispensable, and the routine examination of blood-pressure as a necessity. For a large section of the patients with whom we have to deal are the subjects of chronic disease, mainly of a nutritional or metabolic character ; such as gout, rheumatism, rheumatoid arthritis, arterio-sclerosis, so-called functional disorders of the liver, &c., and another large section comprises those who are "out of sorts," "run-down," "over-worked," suffering from no definite train of symptoms that can be labelled with the name of any definite disease, but who are, nevertheless, departures from the normal. It is among these that we have exceptional opportunities of studying the beginnings of disease, the period of transition from the physiological to the pathological, when often treatment may be of signal service in turning the scale back to the normal. In no condition is this better exemplified than in arterio-sclerosis, a state of the utmost importance to the life of the individual ; easily recognized, but with difficulty treated when well established, difficult to diagnose, but to some extent amenable to treatment in the early stages.

Chronic nutritional disease may be brought about by prolonged disturbance of one or all of three stages of the process of nutrition, which are sequentially dependent each on the other. The primary or alimentary stage is governed by the character of the food ingested, and the capability of the digestive organs ; the intermediate stage of storage depends on the functional activity of the liver and its power of destroying toxins. The third or distributive stage depends on the proper interchange of fluid between the tissues and tissue-fluid, and between the latter and the blood ; and this in turn depends largely on the soundness of the blood vessels, and on their capability of contraction and dilatation. In other words, it depends largely on changes in blood-pressure. The first two stages are clinically investigable by various means. The performance of the last stage cannot be directly observed,

but may be inferred from the changes that take place in the capillary circulation, as deduced from observation of the arterial and venous blood-pressure. Any method, therefore, which gives us more exact information as to the state of the vascular system cannot fail to be of service in the treatment of chronic disorders of nutrition. Especially is this the case in so-called Spa treatment, the main factors of which consist of the administration of waters, and of baths, appropriate dieting, and exercise, active or passive. Three of these influence the body primarily by changes induced in the circulation; waters, mainly by their diluent effect on the blood, for the specific action of the medicinal constituents of the waters is in most cases—with a few notable exceptions—of secondary importance; baths, entirely by the changes they excite in the circulation, for there is no proof that mineral constituents of waters used for bathing are absorbed by the skin; exercise, by stimulating the circulation and promoting the flow of lymph. Diet, though it mainly concerns the primary or alimentary stage of nutrition, has a marked effect on the blood-pressure, and through its influences the final or distributive stage. To be able to measure the changes taking place in the blood pressure as the result of hydrotherapeutic agents is therefore of value, not only in the selection of the appropriate agent, but in affording a more exact estimation of its effects than could otherwise be obtained.

It has been objected that equally precise information may be derived through the medium of the well-trained finger, but this I am convinced is an error. Without in any way deprecating the cultivation of the *tactus eruditus* there is no doubt in my mind that the use of the blood-pressure gauge will frequently give information that may escape the tactile method, and, further, that the interpretation of sensations conveyed through the finger may sometimes be erroneous. For example, it is not uncommon to meet with cases presenting symptoms of oppression or pain in the chest, dyspnoea on exertion, and ready fatigue, having an apex beat displaced outwards, without valvular lesion, and a pulse that may or may not be tense to the touch, and which have been treated with

pressor remedies, such as digitalis or strychnine, without relief, when the use of the manometer would have at once revealed the presence of a high blood-pressure and have indicated the employment of depressor remedies. To lighten the load is surely sounder than to flog the labouring heart.

CASE 1.—A University professor, aged 40, leading a sedentary life and living well, was sent to me in 1902 complaining of breathlessness, fatigue and general malaise, of some months' duration. He had been taking heart tonics, including digitalis, for some weeks without benefit. On examination his pulse was 72, not particularly tense to the feel, vessel wall soft; his blood-pressure was $\frac{145 \text{ diastolic}}{190 \text{ systolic}}$; the apex beat lay $\frac{1}{2}$ inch outside the nipple line, and there was no bruit; he suffered from dyspepsia, and his liver was slightly enlarged. Dieting, depletory waters and massage douches reduced his pressure to $\frac{130}{170}$, and the apex beat came within the nipple line. He left very much better, with instructions to modify his diet, to take periodically a mercurial pill and to take more exercise. I saw him in 1903, and found his pressure $\frac{120}{150}$; again in 1904, when it was $\frac{115}{140}$; in 1905, $\frac{100}{135}$; and in 1906, $\frac{100}{130}$, heart normal. During these years he had kept perfectly well, and had no return of his old symptoms. The case was one of hyperpiesis which had not lasted sufficiently long to produce arteriosclerotic changes.

It is from a radial artery unduly small, or actively contracted, that an illusory tactile sensation is apt to be derived, for under these conditions the finger is unable to appreciate so well the degree of tension. A vessel markedly atheromatous may also convey a false impression.

The converse condition of low tension of the circulation being mistaken for high pressure is not so common. I have here notes of two cases in which it was strikingly exemplified.

CASE 2.—A gentleman, aged 42, consulted me for symptoms of pain on exertion in the chest and down the left arm, and fatigue, both bodily and mental. He had been subjected to a great deal of mental worry. He had been told he was suffering from high tension of the circulation, and the pulse certainly gave that impression: it was slow, 48 per minute

regular and full. The apex beat was outside the nipple line, and there was a faint roughness of the first sound. The blood-pressure was found to be $\frac{80 \text{ diastolic}}{100 \text{ systolic}}$. Rest, with a course of digitalis and strychnine, raised the pressure in a few days to $\frac{90}{110}$, the apex beat came within the nipple line, and he felt markedly better.

Again :—

CASE 3.—A lady, aged 33, complained of palpitation, spasms of pain in the chest, and irregular attacks of coldness and prostration. She had seen an eminent physician who prescribed nitroglycerine, with very uncomfortable subjective results (to the patient). I found her heart normal in position and sounds, her blood-pressure low, $\frac{90}{115}$: her pulse 88, small and somewhat contracted to the feel. Further examination revealed marked hysterical stigmata, hemianæsthesia, contracted fields of vision and tender spots. Treatment on lines directed against the neurosis gave relief to her symptoms in a few weeks.

In the estimation of blood-pressure certain precautions should be taken to avoid error. The posture of the patient, the level of the arm with relation to the heart, the time of day with relation to meals, all must be the same in successive observations to ensure comparable results. Nervousness on the part of the patient, especially in neurotic women, may lead to an erroneous observation, and due allowance must be made or the observation rejected.

A difficulty is sometimes encountered in cases of focal arterio-sclerosis, in which excessively high readings of the systolic pressure—250 millimetres Hg., may be taken from the brachial artery. The pressure taken from the forearm, or the radial artery alone, or from the brachial on the opposite side, may yield quite a different figure, the discrepancy amounting sometimes to as much as 60 or 70 millimetres Hg. The explanation appears to be that with a highly atheromatous vessel the pressure applied by the armlet is not sufficient entirely to occlude the vessel, a chink being left in the lateral part of the lumen through which blood can flow in quantity sufficient to convey an impulse to the finger on the radial

artery below. Suspicion may be aroused as to the true nature of these cases by an examination of the heart disclosing absence of cardiac changes of hypertrophy or dilatation, and especially absence of an accentuated aortic second sound; and the suspicion may be confirmed by digital examination of accessible vessels, and of the retinal vessels by the ophthalmoscope. In such cases the diastolic pressure may be normal, and the apparent systolic pressure enormously high; the former, therefore, in these instances, is the safer guide to the true state of tension of the circulation.

The measurement of blood-pressure should always be read in conjunction with facts derived from examination of the heart, of the vessels, digitally, and by the ophthalmoscope, and of the urine; as an isolated observation it is of little value. Readings should be taken if necessary from more than one artery, from the smaller arteries of the fingers as well as the radial or brachial. A knowledge of the pressure of these areas, coupled with that of the venous pressure on the dorsum of the hand, will give a tolerably accurate conception of the state of the capillary circulation, and from this may be inferred the adequacy or inadequacy of tissue-fluid interchange.

The average brachio-radial pressure in a normal healthy adult is about $\frac{95 \text{ to } 100 \text{ diastolic}}{110 \text{ to } 120 \text{ systolic}}$, the physiological variations ranging from $\frac{80 \text{ to } 115 \text{ diastolic}}{90 \text{ to } 145 \text{ systolic}}$. In women the pressure is said to be somewhat less than in men; in children it is lower still, the diastolic pressure ranging from 55 to 70, and the systolic from 70 to 90, between the ages of 2 and 10, the two pressures approximating more closely than in adults.

The following are some of the conditions in which the measurement of blood-pressure has been helpful to me in practice.

ARTERIO-SCLEROSIS.

Taking the term arterio-sclerosis in its literal meaning of a hardening of the arteries, the best classification of its varieties for clinical purposes is the broad simple division into focal and diffuse. The focal comprises endarteritis obliterans—which does not come within the scope of this

paper—and atheroma. The diffuse comprises arterio-sclerosis as generally understood, and arterio-capillary fibrosis or angio-sclerosis.

Atheroma usually begins centrally and spreads peripherally; is commonest in, but not confined to, the large arteries; and avoids the visceral vessels. It is not merely a local form of diffuse arterio-sclerosis, but is essentially different, and may occur alone, though usually it is accompanied by the diffuse form. The causes are senile decrescence combined with strain, intoxications, and infections.

Diffuse arterio-sclerosis begins peripherally and spreads centripetally, involves the systemic and visceral vessels, and eventually the whole vascular system. It may occur without the focal form, though in the later stages the larger vessels usually become the seat of atheroma. The cause is prolonged high tension of the circulation produced under a variety of conditions, the commonest of which are chronic intoxications such as gout and lead, infections such as typhoid fever, and prolonged hyperpiesis. It may be secondary to kidney disease, or may occur primarily, and lead to secondary renal disease, the arterio-sclerotic kidney.

It is seldom, however, in any given case that we are able to isolate one cause as solely operative in the production of either focal or diffuse arterio-sclerosis; most often two or more are combined, such as gout and senile changes; gout, alcohol, and muscular strain; or hyperpiesis, alcohol, and tobacco. Arterio-sclerosis, therefore, is not, strictly speaking, a disease in itself, but an accompaniment of many diseases.

In *pure senile or "decreascent" atheroma* the blood-pressure will frequently—I would almost say usually—be found normal or subnormal, even though the vessels be extensively diseased; for atheroma, though widespread, affects but a small proportion of the total vascular area, and notably leaves the splanchnic vessels untouched.

CASE 4.—A typical example was a man aged 79, in good health, with a sound heart, a regular slow pulse, vessels that were hard, patchy and tortuous, and a blood-pressure of ^{100 diastolic}_{120 systolic}. He had always been a small eater, and for fifty years had made a practice of eating no luncheon.

In these cases the heart is usually sound, and the aortic valves are perfect. If the blood-pressure be high, the diffuse form of arterio-sclerosis is present in addition to the focal; or the aorta has become dilated, the valves affected, and the heart hypertrophied. The manometer is useful in helping to distinguish between these conditions, and is to some extent a guide to prognosis as to whether a catastrophe is imminent in the way of arterial thrombosis on the one hand, or cerebral hæmorrhage on the other.

In the *diffuse peripheral form of arterio-sclerosis* the pressure is generally, but not always, supernormal, and it is interesting to follow, with the aid of the manometer, the gradual development of cardiac changes in the course of time, either from focal sclerosis affecting the aorta or from the heart gradually failing under the high pressure against which it is called upon to work. It is astonishing how long a heart will maintain itself against a persistently high pressure without giving way, as the following example will show.

CASE 5.—A man, aged 60, seen in 1901, had a pressure of $\frac{145 \text{ diastolic}}{190 \text{ systolic}}$ with a sound heart, the apex beat being normal in position. In 1902 his pressure was $\frac{165}{210}$, apex beat well within the nipple line. In 1903 the pressure was $\frac{145}{190}$, the apex beat in the nipple line, the aortic second sound accentuated, but there was no bruit. In 1904 he had attacks of dyspnœa, with pain in the left arm. His pressure was $\frac{165}{210}$. In 1905 his pressure was $\frac{160}{200}$, the apex beat lay outside the nipple line, the aortic second sound was much more accentuated, but still there was no bruit. During the whole time the urine was of good specific gravity and contained no albumin. Since then I have not seen him.

On the other hand, here is a case showing the gradual development of marked cardiac changes.

CASE 6.—A man, aged 63, seen in 1901; he had had gout, irregular and articular, had taken vigorous exercise all his life, and in his youth had been an athlete. He was a liberal drinker and a very heavy smoker, so that many causes combined to produce arterio-sclerosis. His pressure was $\frac{145}{185}$, his heart enlarged, the aortic second sound accentuated, but there

was no bruit. In 1902 he had several attacks of epistaxis, and when I saw him his pressure was down to $\frac{110}{150}$, apex beat in the nipple line, and a systolic bruit had appeared at the aortic area. Two years later, in 1904, his pressure was $\frac{125}{165}$, and the systolic bruit more marked. In 1906 his pressure was higher, $\frac{130}{175}$, apex beat one inch outside the nipple line, and a diastolic bruit had developed in addition to the systolic. While under observation he had a profuse epistaxis, which reduced his pressure to $\frac{100}{145}$. In 1907 his pressure was $\frac{120}{165}$, and the diastolic bruit was more marked. He is a subject impatient of treatment, but had I the opportunity of seeing him frequently I would not hesitate, on observing his systolic pressure keeping persistently in the neighbourhood of 170 mm. Hg., to anticipate Nature by bleeding him freely, lest her next attempt should be in a more dangerous place.

HYPERPIESIS.

The condition known as hyperpiesis, described by Clifford Allbutt, is brought about by continued excess in diet—especially in nitrogenous food and alcohol—combined with insufficient exercise. It is characterized by digestive disturbance, fulness of the liver, increased viscosity of the blood, and high tension of the circulation, which latter may be, as Russell suggests,¹ an exaggeration of the physiological reflex rise in blood-pressure which follows the ingestion of food. At first the periods of high tension occur irregularly and intermittently, but eventually the rise becomes persistent, and if untreated may lead to arterio-sclerosis. As our knowledge increases of the toxic bodies formed in the alimentary canal, it is probable that hyperpiesis will be referred to a toxæmia of chemical or bacterial origin. The persistent high blood-pressure of early hyperpiesis may usually be distinguished from that accompanied by declared arterio-sclerosis by its reaction to treatment; if the disturbance be functional and not organic, the pressure rapidly falls under suitable dieting

¹ *British Medical Journal*, February 10, 1906.

and drugs. A useful method of ascertaining whether arterio-sclerosis is well advanced is by administering $\frac{1}{200}$ to $\frac{1}{100}$ of a grain of nitro-glycerine and observing the effect on the pressure. If the vessels are actively responsive, a marked fall in the brachio-radial pressure and a rise in the digital pressure will be obtained; if the change is but slight, some degree of arterio-sclerosis is probably present; if no change takes place, it may be inferred that the condition is well advanced. I have found a short course of Aix massage douches at a temperature of 100° F. useful in a similar way.

The following is an interesting case of hyperpiesis:

CASE 7.—A lady, aged 48, gave the history of having, years ago, had glycosuria, in consequence of which she was rigidly dieted on a meat diet, which she had continued uninterruptedly since. Also, like many women, she drank very little fluid. Finally, she began to complain of breathlessness on exertion, pain in the chest, and ready fatigue. She consulted Sir James Barr, who found her blood-pressure excessive, altered her diet, prescribed depressor remedies, and later on sent her to Harrogate for a course of treatment. When I saw her in June, 1906, her pressure was $\frac{115 \text{ diastolic}}{150 \text{ systolic}}$, the heart somewhat enlarged, the aortic second sound accentuated, without a bruit. The urine was normal, and she had no organic disease. A three weeks' course of Nauheim baths reduced her pressure to $\frac{105}{130}$. In September she had another course, and left with a pressure of $\frac{105}{125}$. I saw her again in June, 1907, when her pressure was $\frac{110}{135}$. In the nine months' interval she had continued her dieting and drug treatment. She had another course and returned home with a pressure of $\frac{95}{115}$, feeling perfectly well. Excessive meat diet combined with too little fluid had brought about a condition of hyperpiesis, which, however, had not continued long enough to induce serious arterio-sclerotic changes.

Another case may be quoted in which prolonged hyperpiesis led to definite sclerosis.

CASE 8.—A lady, aged 52, had all her life been an excessively small drinker, a teetotaller, and an average though not excessive eater. She had complained at intervals during

the last four years of attacks of "sinking" oppression and pain in the chest and dyspnoea on exertion. Previously she had always been perfectly healthy. I saw her in February, 1907, and found her pressure $\frac{160}{205}$; apex beat in sixth space $4\frac{1}{2}$ in. out; first sound forcible; systolic bruit at aorta; aortic second sound ringing; urine sp. gr. 1021; no albumen. A course of dieting and baths reduced her pressure in a month to $\frac{125}{160}$; the apex beat came in half an inch, and the systolic bruit disappeared. Beyond this point the pressure could not be reduced, and it failed to react to nitro-glycerine. Nine months later I saw her again, during which time she had continued her dieting and taken iodide of potash almost continuously, and found her pressure still at the same point, $\frac{125}{165}$; the apex beat was 4 in. out in the fifth space; first sound not so forcible; no bruit at aortic area. She said she felt much better and had had no return of her attacks of pain. Another course of baths failed to effect any reduction, and the probability is that arterio-sclerosis is well established.

The manometer is invaluable in the detection of high blood-pressure in the early stages, when no symptoms need be present pointing to the condition, and when treatment is most likely to be of use in preventing organic changes.

The treatment of diffuse arterio-sclerosis when well-established is unsatisfactory. The cause should be removed when possible, but as this is usually multiple, removal is difficult of attainment. The withdrawal of lead, alcohol, tobacco, the treatment of the gouty state or of hyperpiesis, the avoidance of strenuous exertion, will all suggest themselves in appropriate cases. Dieting is most important, the chief indications being moderation in quantity, diminution of nitrogenous purin-holding foodstuffs, thorough mastication of food, and free flushing of the body with abundance of plain water. The alimentary canal should be kept in as healthy a state as possible, and endeavour should be made particularly to lessen putrefactive changes. The development of the disease may be arrested, or its progress delayed, in the early stages; little can be done in the later stages to remove structural changes

already well established as the result of causes which may no longer be in operation. Of drugs, iodine and the iodides are most generally used, and although they produce no immediate vaso-dilating effect, they will, if long continued in sufficient doses, cause a widening of the peripheral vessels and a fall in pressure. Mercury is invaluable in early hyperpiesis; and in small doses, given steadily, it has appeared to me useful in advanced arterio-sclerosis. Thyroid extract, given with caution, is a valuable remedy in certain cases. Vaso-dilators are of great service, not only in the occasional use of the more powerful drugs to produce immediate relief of symptoms, in cases that will react to them, but also in the continued use of the milder but longer acting drugs, such as erythrol, the nitrites, peptone, benzoates and hippurates. Erythrol, though a valuable drug, is, in my experience, disappointing, for many patients cannot take it even in small doses on account of the headache it produces. It should be emphasized that vaso-dilating drugs, while relaxing the peripheral vessels, do not touch the cause underlying their constriction, and should therefore be used merely as adjuncts to other measures having a more permanent effect; also that too sudden or too great reduction in pressure may be harmful to the patient, for a certain level of pressure is requisite to ensure an efficient capillary circulation.

The spa treatment of high blood-pressure, with or without arterio-sclerosis, is advantageous. The removal of possible sources of toxæmia by the thorough washing out of the alimentary tract; the promotion of free elimination by the kidneys and skin; the stimulus given by baths to fluid interchange between the tissues and the blood; suitable dieting and exercise; these, together, will do more in a given space of time than any system of drug treatment. Repetition of the course at more or less frequent intervals is advisable. Of the baths, the most useful are the massage douches, Aix and Vichy systems, the Turkish bath, and the Nauheim baths.

GOUT.

In gout the blood pressure is usually supernormal, but by no means uniformly so. Indeed, I am disposed to think,

as the result of my own observations, that in cases of articular and tophaceous gout the general level of blood pressure, in the intervals between acute attacks, is more often normal, or subnormal. A rise precedes and a fall follows an acute attack. In irregular gout, on the other hand, the pressure is almost always supernormal, and consequently these are the cases most likely to develop arterio-sclerosis. Of 50 consecutive cases of gout, recorded in my case book, 21 were cases of articular gout—that is to say, they had recurrent attacks of joint gout and were comparatively free from symptoms in the intervals ; and 29 were cases of irregular gout—that is to say, they may have had at some period one or more attacks of joint gout, but suffered mainly from the various manifestations of abarticular gout. Of the 21 cases of articular gout, at ages ranging from 37 to 79, only 3 had a systolic blood-pressure of over 140 mm. Hg. ; while of the 29 cases of irregular gout, at ages from 40 to 68, only 4 had a systolic pressure of under 140 mm. Hg. Accepting the theory that the essential cause of gout is a toxæmia of gastro-intestinal and possibly bacterial origin, if the gouty paroxysm be the measure of the tissue resistance against the toxin, as Woods Hutchinson¹ ably suggests, the explanation of the high pressure in irregular, and low pressure in articular, gout is apparent. The acute attack clears the blood of toxic substances for the time being, and the pressure falls and remains low until re-accumulation takes place ; in irregular gout, the tissue resistance being less, the presence of toxic bodies is more continuous and the pressure remains uniformly high.

The following cases are two examples of low pressure in articular gout :—

CASE 9.—A gentleman, aged 74, had acute attacks of gout for twenty years, but was quite well in the intervals. His blood pressure, taken on several occasions, was $\frac{100}{120}$, his vessels and heart quite healthy.

CASE 10.—A man, aged 60, had acute attacks of gout for many years, dating from an old attack of chronic lead poisoning.

¹ *Lancet*, 1903.

His pressure averaged $\frac{90}{110}$. His vessels, heart, and urine were normal. The case is interesting as showing that gout induced by lead need not necessarily give rise to permanent vascular or kidney changes.

The following is an example of high pressure in irregular gout, showing the gradual development of cardio-vascular changes and renal disease :—

CASE 11.—A man, aged 65, consulted me in 1905 for attacks of cardiac pain and irregularity, depression and irritability of temper, insomnia, and loss of appetite. Years ago he passed a stone from the kidney, and had since had one mild attack of gout in the toe. His blood-pressure was $\frac{180 \text{ diastolic}}{225 \text{ systolic}}$; heart enlarged, but no bruit, urine, sp. gr. 1016, containing no albumin. In 1906 I saw him again. He had had no acute gout, but various manifestations of irregular gout, including one heart attack. His pressure was $\frac{150}{200}$, pulse intermittent; there was a systolic apical bruit, and a markedly accentuated aortic second sound. He had slight oedema of the legs: his urine, of sp. gr. 1015, contained more than a trace of albumin. A year later, in 1907, his pressure was $\frac{130}{170}$: the apical bruit more marked; oedema increased; and albumin constantly present in the urine. The pressure being lower in each successive year shows, with other evidence, that the heart is slowly failing.

As illustrating the transmission of a hereditary tendency to gout the following examples may be cited :—

CASE 12.—Colonel, aged 68, a generous liver, had had one attack of acute gout in the toe; suffers from "fulness in the head," and has had repeated attacks of transient loss or confusion of speech, tremor and hemiplegic weakness, due doubtless to intermittent claudication of the cerebral vessels. His pressure was $\frac{120}{160}$, vessels hard, systolic apical bruit. His daughter, aged 40, had never had gout, but suffered from a "poor circulation," cold hands and feet, fulness in the head, headaches. Her vessels were markedly contracted, brachial pressure $\frac{115}{150}$, digital pressure 40, venous pressure in the dorsum of the hand practically *nil*, and tissue fluid *nil*. There is little doubt that if such a condition is allowed to continue, she will,

in the course of time, develop gout, and possibly cerebral symptoms similar to those of her father.

The manometer in cases of gout affords a useful guide to treatment : in the low pressure cases this may be more tonic in character and the diet more generous ; in high pressure cases depletory measures are indicated.

FIBROSITIS.

An interesting condition, allied in some respects to gout and the gouty state, is the so-called rheumatic inflammation of the fibrous tissues ; lumbago, sciatica, pleurodynia, stiff neck, inflammation of the tendo achilles, perineuritis in various situations. Many, if not most, of these cases have never had gout, nor rheumatic fever ; they cannot be called gouty, nor yet rheumatic in the proper sense of the words. Nor is the condition related to chill, but is, undoubtedly, toxæmic in origin, the toxic substance being analogous to that of the gouty state, but differing in its effects. The one factor common to all these cases is long-continued or oft-repeated digestive disturbance, often of a very mild subjective character, but nevertheless present. A very common occurrence is persistent diminution in the acidity of the urine, with the ready deposition of phosphates, giving rise to the so-called dietetic phosphaturia, though the phosphates are rarely, if ever, in actual excess. I am disposed to think that cases of digestive derangement accompanied by persistent increase in the acidity of the urine with frequent deposition of uric acid, are more likely to develop into gout, while those with diminished acidity and the deposition of phosphates are more prone to attacks of fibrositis, or later on to develop chronic arthritis of the rheumatoid type. The cause of the lessened acidity is not clear. Treatment by hydrochloric acid gives marked relief to the digestive disturbance, removes the phosphaturia and lessens the tendency to fibrositis and joint troubles.

The blood pressure in these cases is not so consistently high as in irregular gout ; most often it is normal or subnormal. Consequently, they are not so liable to the development of arterio-sclerosis. The toxic material, whatever it may be,

seems to spend itself in the acute attacks and to be less active than the gouty poison in producing arterial constriction. Of fifty consecutive cases of fibrositis, taken from my case book, of ages ranging from 22 to 70, only seven had a systolic blood-pressure of over 140 mm. Hg.; and of these seven, five had definite gouty histories.

Here is a typical case which I have had under observation for three weeks every year for the last seven years :

CASE 13.—A gentleman, aged 62, consulted me in 1901. He had never had gout, but had suffered from two or three attacks of lumbago each year for several years back, each laying him up in bed. His pressure was $\frac{105}{135}$, heart sound, urine phosphatic with diminished acidity, and he had chronic digestive disturbance. In 1902 he had one attack of lumbago and a mild synovitis of the knee joint, pressure $\frac{120}{150}$. In 1903 $\frac{105}{135}$, no lumbago; in 1904, $\frac{105}{140}$, no lumbago; in 1905, $\frac{100}{135}$, had threatenings but no attack; in 1906, $\frac{105}{145}$, no attack; in 1907, $\frac{110}{145}$, had a mild attack of sciatica, and synovitis of the knee-joint. Each year he had a course of spa treatment, which clearly lessened his liability to attacks of lumbago. His urine before each course was always subacid and phosphatic.

CASE 14.—Another case: A professor of physiology had suffered for years from "atonic dyspepsia" with subacid urine and "phosphaturia"; showed well-marked Heberden's nodes on the fingers and had a blood pressure of $\frac{100}{135}$. When I last saw him he was laid up with a mild attack of sciatica.

CHRONIC BRIGHT'S DISEASE.

In cases of arterio-sclerosis with chronic granular kidney very high blood pressures are met with, such readings as $\frac{160 \text{ to } 180 \text{ diastolic}}{200 \text{ to } 260 \text{ systolic}}$ being not uncommon. The urine is increased in quantity, of low specific gravity, may or may not contain a trace of albumen, shows granular casts and a diminished output of urea. When arterio-sclerosis is primary and the kidneys become secondarily affected, the urine remains of good specific gravity for a long time, albumen appears intermittently, casts late, and the output of urea remains good

until the condition is well advanced. I have watched cases of arterio-sclerosis go on for years without any lowering of specific gravity or appearance of albumen in the urine. The possibility of albuminuria being due to backward pressure from a failing heart must be borne in mind; the state of the heart, the quantity of specific gravity of the urine, the amount of albumin, and the presence of œdema will enable a distinction to be made.

The treatment of high blood pressure in chronic kidney disease is most unsatisfactory. It is often possible to lower the pressure temporarily by dieting, baths and drugs, but it soon regains its high level. Here is an example of a temporary lowering of pressure giving relief to a distressing symptom :

CASE 15.—A man, aged 44, complained of morning vomiting and severe headaches which completely prostrated him. His blood pressure was $\frac{155}{200}$, heart enlarged, with no bruit; urine specific gravity 1010, contained two parts albumin per mille, and granular casts. Milk diet, Aix and Turkish baths, and trinitrine reduced his pressure in a few days to $\frac{125}{150}$, and his vomiting and headache entirely disappeared. The pressure remained low for five months, then gradually crept up to $\frac{165}{210}$, a systolic bruit appeared at the apex and aortic area, the urine was of specific gravity 1007 and contained albumin 3 per mille. His violent headaches returned and he is now on the verge of uræmia.

The length of time these cases may last is surprising.

CASE 16.—I have notes of a case of a man aged 60, whom I first saw in 1901. He then had advanced granular kidney; pressure $\frac{180}{230}$, apex $1\frac{1}{2}$ inch outside nipple line, systolic bruit, polyuria, urine 1006, albumin and casts. In 1902 his pressure was $\frac{170}{220}$: a loud diastolic aortic bruit has developed. In 1903, pressure $\frac{145}{190}$: in 1904, $\frac{140}{190}$: in 1905, $\frac{135}{185}$: a diastolic bruit at apex and aortic area; urine 1002, albumin increased. Owing to gradual failure of the heart his pressure fell year by year and he died in 1906. The fact that he lived in a tropical country probably helped him to survive so long.

MENOPAUSE.

Another difficult class of cases in which high tension of the circulation often gives rise to troublesome symptoms is the menopause in women. In many the high pressure is due to existing arterio-sclerosis, but in most, I think, it is due to persistent spasm of the vessels of nervous origin. The pressure, though high, does not as a rule lead to cardiac changes, nor yet to arterio-sclerosis unless some toxic factor is at work as well. It is more amenable to treatment by drugs like the bromides, valerianates, and ichthyol than by hydrotherapeutics or vaso-dilators; the last usually produce intolerable headache. In my experience treatment of any kind is generally of but temporary service, the only permanent cure being time.

If any toxic condition existed before the menopause, tending to gout, or fibrositis or rheumatoid arthritis, it is apt to be much exaggerated at this epoch and to declare itself definitely; most often, I think, it proves to be rheumatoid arthritis, or a chronic arthritic condition closely resembling it. Also a pre-existing hyperpiesis is very prone at this period of life to result in definite arterio-sclerosis; a sequence which is largely favoured by the habit engrained in many women of drinking far too little fluid. Too often the habit has been so long continued that rectification comes too late when organic changes have become established. In others the benefit derived from free flushing out of the body is often very striking.

RHEUMATOID ARTHRITIS.

In the acute or subacute rheumatoid arthritis of young subjects the blood-pressure is usually subnormal, and rises as improvement takes place. In the chronic arthritis of middle age it is more often than not supernormal, but allowance must be made for other possible factors at work, and for the physiological increment due to age. It is not raised so constantly, nor to the same extent, as in the gouty state; nor is the toxæmia of rheumatoid arthritis so prone to lead to arterio-sclerosis.

NEURASTHENIA.

In neurasthenia of the asthenic, cerebral, or spinal types the blood-pressure is low. In the neurotic as distinguished from the neurasthenic it is usually raised, sometimes markedly so; in neurotic women excessively high readings may be obtained, and may lead to error unless one is aware of and on the look-out for them. The rise is due to spasm of the vessels plus a rapidly acting irritable heart.

HEART DISEASE.

In primary heart disease, as distinguished from heart disease secondary to arterial disease, the blood-pressure in well-compensated cases is usually normal or supernormal; the latter when the lesion has resulted in marked hypertrophy of the ventricle. In these cases the high pressure is salutary, and it is unwise to make an attempt to reduce it with the object of lessening the work of the heart. In one case of mitral regurgitation with great cardiac hypertrophy the pressure was $\frac{175}{220}$, and when it was reduced below this level the patient felt ill and suffered from giddiness and faintness. When compensation begins to fail it is remarkable how well the pressure keeps up until near the end, when it rapidly falls. In a case of dilated heart from adherent pericardium, having dyspnoea, irregular pulse, dropsy, enlarged liver, and scanty, albuminous urine, the pressure was $\frac{110}{150}$, the patient lying at rest in bed.

In aortic regurgitation the difference between the systolic and diastolic pressures may be very wide: in one case I noted $\frac{100 \text{ diastolic}}{170 \text{ systolic}}$, in another $\frac{85}{160}$; the amount of the difference gives some indication of the extent of the leakage at the aortic valve.

In the treatment of heart disease by the Nauheim baths the manometer is helpful in gauging the effects produced. Not only may the pressure be determined, but an indication may be obtained of the increasing amplitude of the pulse-wave after successive baths. Observation of the blood-pressure suggests the temperature at which these should be employed;

the higher temperatures, 95°-100° F., when vaso-dilating effects are required ; the lower, 94°-86° F., when it is desired to raise the pressure.

ANÆMIA.

In secondary anæmia from loss of blood or wasting diseases the pressure is usually subnormal. In chlorosis, on the other hand, I have frequently found it normal or above normal—a fact which may be due to the increased volume of the blood now known to obtain in this disease.

I cannot forbear quoting the following case, which presents many points of interest :—

CASE 17.—Miss B., aged 45, had been ailing, off and on, all her life, with symptoms of weakness, palpitation, and breathlessness. She had a high colour and did not look particularly anæmic, and was sent to me as a case of chronic Bright's disease, as she had a trace of albumin in the urine and a high tension pulse with cardiac enlargement. I found her blood state as follows : Hæmoglobin 43 per cent., red cells 4,500,000, white cells 7,500, colour index 47. Her blood-pressure was $\frac{115}{155}$, apex beat in the nipple line, and there was a loud systolic pulmonary bruit, and bruit de diable in the neck. The urine was of sp. gr. 1012 and contained a trace of albumin. During six weeks' treatment by waters, baths, and iron internally, her blood-pressure gradually fell as her blood state improved ; the albumin early disappeared from the urine, the specific gravity rose to normal, and she gained 7 lb. in weight. On leaving her blood state was : Hæmoglobin 90 per cent., red cells 5,800,000, white 8,000, colour index 77 ; blood-pressure $\frac{97}{130}$, apex within the nipple line, hæmic bruits faint. Though there was still some degree of anæmia, as shown by the colour index 77, she expressed herself as feeling better than she had ever done in her life, and departed with instructions to continue taking iron for at least six months. It may be said that the case was one of anæmia from kidney disease which will reassert itself later ; but I believe it to be one of those cases of life-long chlorosis occasionally met with, which have either

been unrecognized or treated intermittently, and never continuously enough to prevent relapse.

SYMPTOMS.

Lastly, the measurement of blood-pressure is often an aid to the diagnosis and treatment of certain symptoms, the cause of which may be obscure. Thus, in two cases of tinnitus when no lesion of the auditory apparatus was discoverable, the manometer disclosed a supernormal pressure, on the reduction of which the symptoms disappeared. Giddiness may be due equally to a low or to a high pressure. Headache relieved by lowering the tension I have already mentioned. A useful lead may often be obtained from the state of the blood-pressure in the treatment of persistent insomnia.

In conclusion, gentlemen, I hope I have not wearied you with too long a paper. My object has been to show how helpful the systematic examination of blood-pressure has been to me in my own practice, and to induce others who may not yet have done so to make use of the method and thereby add to our knowledge of blood-pressure in various diseases.

A word of caution, and I have done. Enthusiasm for any subject is apt to raise it to the rank of a fetish, and in this instance to lead to the consideration of every case in terms of blood-pressure, to the exclusion of other and more pressing requirements—an error into which no well-balanced mind will allow itself to fall.

DISCUSSION.

Dr. LEONARD WILLIAMS said : I have had the advantage of carefully perusing the paper, and wish to congratulate Dr. Edgecombe upon its thoroughness, and the Society upon having had the advantage of such an excellent contribution.

Although I find myself in cordial agreement with almost everything that Dr. Edgecombe says, there are one or two points which he has, in my opinion, touched upon rather too lightly, and which I therefore desire to emphasize. The first

is in connection with the digital method of estimating blood-pressure. Professor Clifford Allbutt long ago pointed out that it was as absurd to talk about blood-pressure in the absence of an instrument as it was futile to talk about temperature in the absence of a thermometer. Someone had opposed to this view that the best method of estimating blood-pressure was the well-educated finger. Now, it is quite impossible to educate the finger, except with the aid of an instrument, and when a person has got into the habit of using an instrument, he very soon finds out how utterly impossible it is to trust to the sensations conveyed to his finger. This impossibility is due to a very simple fact. Our senses are capable of estimating total force only. They are quite incapable of estimating total force per unit of surface. Having regard to the fact that the radial artery varies enormously not only in different people, but in the same person under different circumstances, it is quite obvious that, unless we possess the power of estimating total force per unit of surface, the digital examination of the pulse must be pure guesswork, and this power no amount of education will suffice to confer upon us.

It is possible, of course, to admit that extreme degrees of pressure in either direction may be gauged roughly; but, to revert to the parallel of the thermometer, the mere vague statement that the blood-pressure is high is of no more value than a similar vague statement that the temperature is high. To serve any useful purpose the one must be recorded in millimetres of mercury and the other in degrees of Fahrenheit. I have therefore no hesitation in repeating what I have said on a former occasion, namely that the man who nowadays pretends to be able to estimate degrees of blood-pressure merely by feeling the patient's pulse prefers a claim which he cannot possibly substantiate, and that such a method, to use Lord Beaconsfield's famous phrase with regard to a certain policy, is not only dead, but damned.

Another point upon which Professor Clifford Allbutt has insisted is that high blood-pressure, hyperpiesis as he calls it, is a curable condition. It used to be held, and is still held by far too many, that a supernormal blood-pressure must be the

result either of kidney disease or of arterio-sclerosis ; whereas the exact contrary is really the case. The hyperpiesis is usually the first event ; and if allowed to continue, by producing certain effects upon certain arteries it may give rise to a general arterio-sclerosis, a cerebral arterio-sclerosis, a hepatic arterio-sclerosis, or a renal arterio-sclerosis. Moreover, simple curable hyperpiesis may exist with other signs which are also far too commonly assumed to indicate renal disease. For the person suffering from hyperpiesis nearly always has frequency of micturition, with a urine which is of low specific gravity which not infrequently contains albumin. One has therefore no right to proclaim that such a person is suffering from chronic interstitial nephritis, or, indeed, any other form of kidney disease, unless in addition there is some definite evidence that the kidney itself is involved, and this evidence is forthcoming only when the presence of granular casts can be demonstrated.

The other point in Dr. Edgecombe's paper which I desire to emphasize is the fact that high blood-pressure, when discovered, must not necessarily be treated as if it were a disease *per se*. High blood-pressure is very frequently a protective measure on the part of the organism. Notably is this the case in heart disease. The pivot of the situation is the medulla, which must under all circumstances be supplied with arterial blood. In heart disease, in mitral stenosis, for example, when there is any tendency whatever to broken compensation, the venous pressure necessarily rises. If the arterial pressure does not rise commensurately, then the medulla is in danger of starvation. We find in consequence that in all cases where the venous pressure rises unduly, as, for example, in mitral stenosis, in emphysema, and similar conditions, the arterial blood-pressure also rises. If any attempt is made to reduce this arterial blood-pressure by means of nitrate of amyl or other drugs, we are thereby directly interfering with Nature's dispositions for the preservation of life, and we are in danger of doing an infinity of harm. The occurrence of high blood-pressure should therefore be traced to its cause. For we have to remember that

a supernormal pressure is not a disease *per se*, but a symptom only; and that it is the conditions which provoke it which require treatment, and not the symptom itself.

With regard to spa treatment of high blood-pressure, especially of the high blood-pressure due to the absorption of gastro-intestinal toxins, I am of opinion that the spas which are most useful for this purpose are those which make a special appeal to the renal output. I do not wish to minimize the concomitant advantages of baths, massage and diet, which are a common and very useful currency at all spas; but, having regard to the fact that it is the nitrogenous waste products which seem most potent in the production of the disease, it is to the organs, namely the kidneys, whose business it is to excrete those waste products, that our chief appeal should be made. For this reason I prefer such spas as Vittel, Contrexéville, and, above all, Evian, to those which concern themselves chiefly with the intestinal output. I am not in any degree disposed to underrate the responsibility of the liver in this matter, but it seems to me that our attitude towards this organ should be that of sparing it as much as possible, of resting it from the hyperfunctioning to which it has been too long subjected. This essential indication is best fulfilled by proper dietetic restrictions—restrictions which can be, and are, as effectively imposed at renal spas as at their purgative rivals.

Dr. GEORGE OLIVER (Harrogate): I am quite sure that the Fellows of the Society will agree with me in regarding Dr. Edgecombe's paper as a clear, well-balanced presentment of the advantages to be derived from the adoption of blood-pressure measurement in spa practice. It is scarcely necessary to remark in such an audience as this that spa practice differs from ordinary or family practice in certain respects; and especially in these two. In the first place, our work is mainly concerned with cases of a chronic type, cases which demand, more particularly, the adoption of physiological modes of observation and the application of physiological lines of treatment. Then in the second place, spa practice mainly deals with patients drawn from different localities, and from the practitioner's point of view they are all less or more new

entities. The work therefore demands the cultivation of habits of quick insight and diagnosis and the capacity to adapt treatment rapidly. Hence the value of methods of physical examination which may aid the natural gifts of the observer, such as the use of the manometer in blood-pressure measurement. Having employed during a period of over twenty-five years all the various methods for determining the arterial pressure which have been suggested by others as well as myself, I am in a position to bear testimony to the practical value of this line of observation in spa practice; and I am glad that Dr. Edgecombe has brought forward some good typical examples which enforce that teaching—so that others may be induced to adopt sphygmomanometric observation. I shall not attempt to discuss the paper, for my observations in the main support the leading points brought forward and there are other Fellows who may have something to say on particular aspects of the paper. We have still much to learn about clinical blood-pressure and the part it plays, notwithstanding all the work that has been done during the past twenty years; and especially during the last ten years. Take, as an example, our unsettled and indefinite knowledge of the relation of arterial pressure to gout. We know very little of that relationship in chronic and acute gout; but the little I know coincides in a general way with Dr. Edgecombe's conclusion, that the subjects of acute articular gout seem to differ in this respect from the subjects of chronic gout of the fibrositic order—these latter being much more prone to supernormal arterial pressure. But we want more facts about the arterial pressure in acute gout as compared with that in the interparoxysmal periods. According to my observation there is great activity in the peripheral circulation, and this requires further study. Whether it is due merely to the febrile movement or to the increased and disturbed metabolism associated with the attack I cannot say.

Dr. Edgecombe has referred to supernormal pressure associated with the menopause, which he attributes to vaso-motor causes mainly. Undoubtedly, considerable fluctuations of pressure do take place at that time—but they are mostly of

a transitory type. Blood-pressure observations are, I think, of considerable importance during the years (five or ten) following the menopause; for then in a certain proportion of cases arterio-sclerosis of the diffuse form is apt to arise; and I am disposed to think that those who pass through the menopause without the flushing and perspirations which trouble most women at that time are more liable to drift towards arterio-sclerosis with a supernormal arterial pressure than those who flush and perspire freely. Then as to the subject of arterio-sclerosis. The more I work at clinical blood-pressure the more impressed I become with the importance of this condition; not merely from the clinical point of view, but from its disturbing influence on our methods of observation. During the past year or two I have been carefully collating the results obtained by different methods. It is next to impossible to ascertain the shortcomings or the limitations of any particular method, if you do not check it by the application of other methods. If you employ one method only you may even grow into the conviction that it is perfect; whereas no instrumental method is perfect or ever will be. The best we can do is to use the least imperfect method—but that is a great gain in this line of observation. I am sorry there is not time on this occasion for me to detail all the results of my observations, which, however, appear elsewhere¹; but I will give you the leading conclusions. I have found the armlet method of considerable value in the study of arterio-sclerosis from the diagnostic standpoint; for when the arteries are thickened the different areas (arm and forearm) are very much more apt to yield variable readings of the systolic pressure than when the arterial wall is normal. I have observed differences of from 10 to even 50 mm. Hg., whereas in normal subjects no appreciable difference can be detected. Then I have observed that another method of reading the arterial pressure (diastolic and systolic), namely, the method of balancing the pulse pressure wave through the arterial wall, is not appreciably affected by the state of the wall,

¹ "Studies in Blood-pressure," Second and Enlarged Edition, 1908.

as it gives the same reading as the armlet in normal subjects and on the two sides in arterio-sclerosis ; but when arterio-sclerosis exists it generally furnishes a lower reading than that of the armlet. I therefore conclude that the armlet method is apt to give us a higher reading of the arterial pressure in arterio-sclerosis than exists as actual blood-pressure. Nevertheless, I regard this method as a valuable acquisition to clinical sphygmomanometry ; for, when supplemented by the method I have named in cases of arterio-sclerosis, we are safeguarded from the disturbing influence of the latter ; and the data obtained enable us to study clinically the state of the arterial wall as well as the blood-pressure. On collating the pressure data furnished by the armlet with the collateral clinical evidence I have encountered not a few clinical incongruities, which have, however, been resolved by employing the combined methods. Even a tactile rendering of the pulse resistance inconsistent with the armlet reading has thus been reconciled and the stigma of incompetency in the finger for estimating the arterial pressure has been removed. This leads me to say that the art of pulse-feeling seems to be vanishing ; whereas it ought to be developed and educated by the aid of trustworthy measurement of the arterial pressure.

To-day I made an observation which shows the practical importance of selecting the most trustworthy method of determining the arterial pressure. For if the method is faulty we may be quite misled ; and we cannot seriously discuss the results obtained by it, or speak about them with any assurance. In this case the systolic pressure afforded by closing the radial artery, *a la* v. Basch or Polain, was 185 mm. Hg., whereas that furnished by the armlet and also by my manometer bulb (a visual method), which I use as an addendum to the armlet method was only 135 mm. Hg. According to the latter readings there was therefore no arterio-sclerosis ; and none was detectable by the finger or the eye. The misleading fact of the radial reading was probably caused chiefly by the unresisting bed of the artery. Now in this case the lower reading was in perfect accord with the tactile estimation of the pulse resist-

ance and with all the collateral clinical evidence.¹ Many similar discordant observations which I have made during past years with the different methods of blood-pressure measurement in vogue have taught me that the selection of the mode of observation is not a matter of indifference; and I trust this hint may be useful to you—as it may save you from spending years in untrustworthy observation with a faulty method.

(Dr. Oliver then demonstrated the using of his new manometer.)

Dr. HARRY CAMPBELL thought that no inconsiderable help could be got from the unaided finger in the estimation of the radial blood-pressure. He did not agree that the arterial blood-pressure was generally heightened in mitral disease, nor that heightened arterial blood-pressure could be of any service in compensating for the “backward pressure” through the veins. He drew attention to a function of the vascular media which had been overlooked, *i.e.*, to prevent by its active muscular contraction the vessel-wall from yielding before the lateral pressure of the contained blood. Actively contracting muscular tissue was able to offer resistance to a stretching force in a manner which passive tissue was incapable of doing. But for the muscular coat of the blood-vessels the entire vascular tree would become aneurysmally distended.

¹ Since making these observations I have received from a *confrère* a letter containing the following references to the discrepancy observable between the readings *à la* Polain and Riva-Rocci:—“My attention was drawn to this divergence by the fact that the reading obtained by our professor of clinical medicine with his Polain instrument was something like 50 mm. above that furnished by my Riva-Rocci. The next morning I took my instrument down to his wards and we tested them comparatively. His results, even in the same patient, were almost ludicrously divergent and in every instance were vastly in excess of mine, and this although we each controlled the pulse in the other’s observation. . . . I may add that, in order that the whole class might determine when the obliteration point was reached, I took down my sphygmograph and applied it to the radial artery. The reading thus obtained may or may not be rigorously exact, but it is at any rate demonstrable.” My correspondent also truly says: “The almost universal use of Polain’s instrument, with its high readings, in France often renders it difficult to follow the train of reasoning in French contributions on blood-pressure.”

RESUMED DISCUSSION ON "BLOOD-PRESSURE IN SPA PRACTICE" (OPENED AT THE PREVIOUS MEETING BY DR. EDGECOMBE).

Dr. FORTESCUE FOX reopened the debate by the following contribution : Dr. Edgcombe's thoughtful and suggestive paper, which raises many interesting points, is worthy of careful study by every spa physician. It deals with one important symptom of chronic maladies, but it is an aspect hitherto too little understood, and its better comprehension will be a substantial gain. In clearing the ground for the study of blood-pressure in spa practice, Dr. Edgcombe has described the distribution of the blood and the interchange in the tissues as the "third stage of nutrition"; and he reminds us that this process takes place through vessels that are capable of active contraction and dilatation. It is obvious that the blood-pressure both in the arterial and in the capillary areas may be a complex result in which many factors are concerned. Quite apart from the vessels, we have the condition of the heart itself, the volume and quality and viscosity of the circulating blood. Indeed, the problem seems to become less simple as our knowledge increases, and new unknown quantities are added to the equation.

In face of this complexity there is perhaps a danger lest we should overlook what is, after all, the prime factor in the maintenance of blood-pressure in health, and the cause of its disturbance in disease. If we exclude cases of gross structural disease of the heart, kidneys and blood-vessels, the efficient cause of disorders of arterial and capillary pressure is *vaso-motor*. Looking at it broadly, we can hardly escape that conclusion. And this reasoning leads us one step further. When we say, as in nine cases out of ten we are entitled to say, that, at all events in the beginning, the degree of contraction of the blood-vessels is mainly the result of vaso-motor influence, it is tantamount to saying that morbid states of blood-pressure must in a great many cases take their place among disorders of the nervous system.

It would ill become the spa physician to look at this matter

from a narrow standpoint, as if the blood-vessels in themselves, or a disturbed chemistry in the tissues by itself, were sufficient to produce these dynamical disorders. I put in a plea for a rather broader view, and here I must in passing venture to challenge a statement made by Dr. Edgecombe, which I think on reflection he will agree with me requires a little modification. I understood him to state that the influence of baths was confined to the circulation. Surely Dr. Edgecombe will admit that baths of various kinds, which we know act through the peripheral nervous expansion, exert an influence which is not by any means confined to the circulation. A single day's experience at any of our spas will exhibit to the careful observer their marked influence upon the central nervous system, and indirectly upon various organs and tissues. In clinical studies like the present, of a somewhat specialized type, I think we shall all feel that it is undesirable and inconsistent with experience to make use of expressions that may be understood to narrow the scope of balneological treatment to one tissue or to one system; for in practice we all know that the use of waters and baths has a wider application in the treatment of chronic disease than any other branch of therapeutics.

In pursuance of the thesis that abnormalities of blood-pressure are symptomatic of vaso-motor disorder, I wish to call the attention of the Society to certain clinical types of circulatory disorder in which I believe the vaso-motor system is primarily at fault. Certain well-marked clinical pictures stand out clearly in my recollections of more than twenty years of spa practice. Some are definitely associated with increased arterial pressure, and all of them would, I conceive, repay closer analysis, not only as respects pressure, but also as respects their etiology and affinities. In all such investigations I think we should remember what Drs. Oliver, Janeway, and others have told us that vaso-motor tone depends on a delicate balance between vaso-constrictor and vaso-dilator action, that there is an enormous variability both of tone and of blood-pressure compatible with health, that in the circulation at large, as well as in any part thereof, the tone

and pressure may vary with temporary or local needs, and that finally there seems to be a certain antagonism between the vascular tone of the skin and that of the internal organs. This last is an important point which our experience at the spas must, I am sure, confirm.

My first clinical type is a condition sometimes spoken of as "poor circulation" in young people. It is often met with in the children of the gouty, and is, I believe, always hereditary. The obvious lack of surface warmth is generally associated with a tendency to internal catarrhs, but these subjects, though always chilly, seldom "take cold." They are cold people, producing too little animal heat, and it is probable that the contraction of the peripheral arterioles, by checking the expenditure of heat, may operate as a salutary protection to the individual, and is, especially in our climate, a compensatory and conservative function. The condition becomes extremely well marked in the colder months of the year, but the circulation improves in a warmer medium, as in the English summer or in a southern climate, or when a better condition of metabolism has been established. It takes a good deal to raise the blood-pressure in young subjects, and I do not think that it is abnormally high in these cases.

A prolonged course of hyperthermal baths has often, in my experience, been of much service in this curious condition. I used to commence with a bath at 108° or 110° F. for two minutes, and increase the temperature by one degree every day or two days (with all proper precautions) until 118° or 120° F. was reached, and have been surprised by the toleration of heat that many persons affected in this way have shown.

I briefly state these results of my own observation in the hope that it may lead working balneologists to use their exceptional opportunities of investigating this condition of the circulation, both from the point of view of pressure and otherwise.

My second type is a common disorder of middle age, which may or may not grow out of the above. The main feature has been well defined by Dr. William Russell as *hyper-tonus*. There is a persistent vascular spasm not only of the

cutaneous, but also probably of the splanchnic arterioles, with more or less marked increase of arterial tension.

If, as I conceive, the condition is truly spastic, it is of course a vaso-motor disorder, and not concerned with any morbid change in the muscles nor even the "deposit of less soluble residua" from the circulating fluids. That excessive pressures may be caused by arterial spasm is shown by the readings in cerebral hæmorrhage, when the medullary vaso-motor centre is directly affected. The elevation of general blood-pressure in that case operates as an aid to the failing circulation in the brain—a circumstance that may well suggest to us that the function of the vaso-motor mechanism is mainly a protective or compensatory one.

What is the cause, and what the effect, of the vascular spasm or hypertonus of middle life? I suggest that it is primarily a nervous disorder which, beginning as a persistent spasm, will, if unchecked, inevitably lead to secondary and structural changes—that is to say, to the condition in the arterioles, in the peripheral vascular area, and in the kidneys, that have been so often described as associated with high blood-pressure. That there is any necessary connection between the high pressure of hypertonus and these structural changes is amply disproved by clinical evidence. Hypertonus may, indeed, exist quite apart from hyperpiesis or plethora. I suggest that it is a pure spasm induced by some irritation of the vaso-motor centres.

It is not hard to understand that a condition of chronic chill of the periphery may in time put too great a strain upon the kidneys, and eventually set up a chronic nephritis, and the associated disturbance in the systemic capillary circulation may well result in the deposit, and proliferation, and contraction of vascular area of which we are told. Under judicious balneological treatment these cases, if treated early enough, often exhibited a marked improvement. Indeed, I am inclined to think that the striking reductions of blood-pressure, and associated benefit to health, that Dr. Edgecombe and others have recorded under the use of baths and waters, must be mainly attributed to their tranquillizing effect

on nerve centres, and the consequent relief of vascular spasm. The more serious sequels of high tension may thus, by timely and repeated recourse to spa treatment, be averted for many years. The "Descent to Avernus," which the poet considers so facile, might be pathologically represented as a facile *ascent* to high and ungovernable pressures. I am at one with Dr. Edgecombe in thinking that balneological measures hold the field as a reasonably hopeful preventive treatment.

Dr. Harry Campbell's remarks on the temporal artery are suggestive, as illustrating a condition of *focal* vaso-motor disorder. I should transgress the limits of our discussion to pursue the matter here. But these focal disturbances may, of course, be associated with a plus or minus condition of general tone, that is, with abnormal pressure. I only wish to add here one practical observation with reference to the treatment of these focal cases. General vaso-remedies are of little or no avail. But if we are right in regarding them, as I do, as phases of neurasthenia, then our treatment must operate through the nervous mechanism, and especially through the skin. I am often surprised how little even practising balneologists are aware of the sedative effect of *subthermal baths*, that is, of baths ranging from the temperature of the blood to that of the skin. Within this limited range there is a whole field of balneological treatment, and one of paramount importance in nervous and circulatory disorders. The reduction of blood-pressure by the tranquillizing of nervous action is always accomplished between these limits. I should make the same remark with reference to the vaso-motor ataxias, which in minor or major degree are so common about the climacteric period in women. The ill-effect of thermal baths, and of stimulating treatment generally, at the menopause must be familiar to us all, but I again urge the plea for the sedative or subthermal baths, and I think that if Dr. Edgecombe will apply this lower range of temperature as I have done, he will not again tell us that hydrotherapeutic treatment is of little use at the menopause. I take it that the condition that Sir Clifford Allbutt has called *hyperpiesis* is not far removed from what has been long spoken of as plethora, or increased

volume of the circulatory blood. He has shed light upon its causation, and shown its possible connection with diet and hepatic disorder. Hyperpiesis is one of the recognised causes of hypertension, but, clinically, should be clearly distinguished from the vascular spasm we know as hypertonus. This distinction has been well recognised by Trunccek, of Prague (quoted by Oliver). The causation of hypertension is, he says, either plethoric or spastic. The difference between these two forms of hypertension is of no small importance from the point of view of balneological treatment. In plethora reduction of intake and active eliminative treatment are indicated, and venesection should, I feel quite sure, be frequently used.

In hypertonus, on the other hand, although the pressures be equally high, venesection has been shown to be inoperative and sometimes injurious. In my own experience the condition of plethora has quite often during a course of waters either threatened, or actually caused, cerebral hæmorrhage. Even in extreme cases of this kind venesection has produced the best results.

I am here reminded of the differences of opinion that may occasionally arise among observers with regard to blood-pressure. Quite recently I was attending a young lady who showed, as I considered, every sign of vascular plethora. The head was hot, the capillaries injected, the breathing embarrassed, the second aortic sound markedly accentuated, and the veins of the neck full. My reading by Hill and Barnard's armlet showed an increase of blood-pressure (135 mm). and I recommended a small venesection, and low diet. As a result, she was examined by a well-known colleague. He had invented an instrument of his own, and wrote me that his results were only 120 maximum to 85 minimum. I have no doubt he was right in his readings. The family was reassured, and the venesection was abandoned. But really, I confess that in estimating the value of our pressure readings, I still rely on observations of the general condition, and even on the "educated finger" which Dr. Leonard Williams affects to despise. Dr. Edgecombe has

done well to remind us that, on the other hand, high pressures of any clinical significance will show some other signs, and these things being so, it is obvious that at present, whilst gratefully accepting the assistance of the instrumental readings, we must look beyond them in forming our final judgment of each case.

Mr. LOCKHART MUMMERY, said his contribution to the discussion must have reference to the instruments employed for measuring blood-pressure, and their value in practice. He had been working at the subject of blood-pressure for four or five years, but in connection with abnormally low rather than high pressures, because it had chiefly to do with conditions of shock and allied states. He had worked at pressures as low as 40, 30, and even 20 mm. of mercury. One thing was quite certain, namely, that the estimation of blood-pressure had passed beyond the stage of saying that the pressure was "high," or "low," or "medium." Blood-pressure must be stated in terms of millimetres of mercury. No one would think of saying, at the present day, that a patient had a high temperature because, when placing the hand on his forehead it was found to be flushed; one would insist on knowing the number of degrees Fahrenheit; and he pleaded for the same precision in regard to blood-pressure, which could be as exactly ascertained in the human subject as could the temperature. Blood-pressure below 50 or 60 mm. was very difficult to estimate by the ordinary sphygmomanometer, but readings above that could be read with but a very small margin of error indeed, as he hoped to show. The instrument could be easily carried about, and could be used in any hospital. At the North-Eastern Hospital for Children he had a nurse taking the blood-pressure of patients after operations regularly for months, without any serious inaccuracy. The new small Hill-Barnard instrument was no larger than an ordinary clinical thermometer, though there was a rubber tube in addition.

There were two ways of estimating blood-pressure; one was by taking the obliteration point of the pulse. Usually the pressure at the radial artery was taken; but it was equally

reliable in the case of the leg. That pressure could be estimated by nearly all the instruments on the table. He had put them to the test of actual laboratory experiments on dogs. A manometer was tied to the right femoral, and round the left femoral a cuff had been adjusted; and the pressure had been read off by one observer with the sphygmomanometer and by another with the mercurial manometer, under circumstances which prevented one observer seeing what was being recorded by the other instrument. A long series of such observations were made, and it was surprising to see how accurately they worked out. Where the greatest difference arose it was ascertained that the cuff had slipped. They were :—

Mercury manometer	...	...	106	108	108	86
Riva-Rocci instrument	...	...	118	107	110	84

The experiments were made so as to make it as comparable as possible with the conditions in the human subject, the cuff being put outside the animal's skin. In order to test the effect when blood-pressure was lowered, venesection was performed, and then the readings were :—

Mercury manometer	...	...	...	...	65	64
Riva-Rocci instrument	...	...	...	...	64	64

In some cases one instrument gave the higher reading, and in others its rival. That cleared up one point, namely, that the variations in pressure were not due to overlying muscular structures, but that what variations occurred in estimating the pressure in a particular case must be due to personal equation. Observations were made in the laboratory by men who had never used the instruments before, and they got within 3 mm. on every occasion. Any Riva-Rocci instrument was as reliable as a clinical thermometer.

There were certain fallacies to be recognized and allowed for. In the instruments with a U-shaped tube the reading must be doubled, and by doubling the reading the error was also doubled. The actual reading of an instrument with a U-tube would therefore not be as accurate as that of a single tube. In the straight tube instrument the tank at the bottom

was likely to be a source of error. A pressure of something like 200 obviously lowered the mercury in the tank, and that would slightly upset the reading of the instrument. It was necessary to have the tank very large, so as to compensate for that, and then the error would be almost infinitesimal. It was also desirable to have the diameter of the tube fairly large, because a large meniscus would allow of a more accurate reading.

With regard to the so-called diastolic pressure—*i.e.*, pressure estimated by arriving at the maximum oscillation-point of the pulse—it had been assumed by Dr. Edgecombe, and had always been assumed by Dr. Oliver, that that was the diastolic pressure. But there was no proof of that. It was very difficult to determine what that pressure was. Since the last meeting, Dr. Syme and he had carried out experiments to try to clear up the point, a very carefully calibrated instrument being used; but he had nothing to offer. Mr. Hill, some years ago, carried out careful experiments with the same object, and he concluded that the point at which the maximum oscillation was shown by the instrument was the mean between the systolic and diastolic pressures. More recently some very elaborate experiments had been carried out in America, with the result that it was not regarded as the mean pressure, though what it was the investigators could not say. It was clear that there was no real proof as to what that pressure was, and the balance of evidence seemed against it being diastolic. It had the one great objection that one had to estimate the maximum oscillation in a small column of fluid, where the total oscillation must be very small. Even if the curves were carefully measured with callipers, it had been found impossible to get a reading nearer than 20 or 30 mm. of mercury. By the systolic method the pressure of the blood could be accurately estimated. At present it was not wise to place much importance on the maximum oscillation-point, because it was not known yet exactly what it was.

Dr. MANTLE (Harrogate) said he had been paying considerable attention to the peripheral changes which Dr. Fortescue Fox had so well described, and for some time he

had recognized that there were distinct types of circulation. For instance, there were warm-blooded subjects with an open periphery, and cold-blooded subjects with a contracted periphery, and that fact should be taken into consideration when measuring the blood-pressure, as also the atmospheric temperature at the time. Two summers ago, at Harrogate, he noticed that all the blood-pressures he recorded were for the most part uncommonly low ; it was a very warm summer. Last summer, which was very cold, there was a tendency for pressures to be high. In cold subjects he had no doubt there was a rather higher reading than in those with a more equable circulation, and such people were more liable to changes in their visceral circulation which were not found in others. Eighteen months ago he published a paper in the *Lancet* pointing out that gastric catarrh, functional disturbance of the liver, &c., were much more frequent in cold weather, and in subjects with a faulty peripheral circulation. He had taken notes of a number of cases of ulcer of the stomach, and he found this condition almost invariably occurred in people with a faulty peripheral circulation. We must bear in mind also that in such subjects there must be increased work put on the heart by the general peripheral constriction, and in that way were produced certain changes of heart muscle. A patient who had been a cold subject all his life would, towards middle age, have a tendency to cardiac dilatation of peripheral origin. Dr. Fox did not mention the heart specially, but referred to the kidney, and he had also observed that subjects of Bright's disease were often people who had had a poor peripheral circulation, though that point was not so commonly observed as in gastric and liver disease. It was only necessary to reflect on the interchange between the cutaneous and the renal circulation to appreciate this point. It was commonly observed that directly some people got their morning cold bath, and with some directly they got into a hot bath—for hot water causes a temporary contraction before dilatation of the cutaneous vessels—there was a desire to micturate, showing that a temporary change of blood-pressure was very rapidly brought about. Those who had an open circulation and said

they never felt the cold were, in his experience, more liable than others to cutaneous disturbances, and he had noticed cases of diabetes or glycosuria were more frequent in such subjects. All these facts pointed to there being an intimate interchange between the cutaneous reservoir and the internal organs. It had been found that the three lowest dorsal nerves, when stimulated, caused a rapid dilatation of the renal vessels; and no doubt other nerves, when stimulated, influenced other organs. With regard to the extent to which the nervous system entered into the matter of blood-pressure, he was sure that where there were huge peripheral changes in cold people the subjects were neurasthenic as a rule. It might be certain toxins acting on the vaso-motor centres caused the vaso-constriction; such, for instance, as those of gout and malaria. Still, the condition of the nervous system must be taken into account when considering the causation of high blood-pressure. And not only the external temperature, but the time at which the measurement was taken should be noted. An hour before a meal the pressure was sometimes several points below normal, whereas an hour after food it might be ten points higher, the rise being simply due to the determination of blood to the splanchnic area for purposes of digestion. He was at a disadvantage in not having heard Dr. Edgecombe's paper with regard to treatment, but considered that patients with high blood-pressure and faulty peripheral circulation, who had a tendency to cardiac dilatation, could be benefited by Nauheim baths; and in young neurasthenic women nothing answered better than electric immersion baths with mixed currents for the uncertain peripheral circulation often associated with a rise in blood-pressure.

Dr. BUCKLEY (Buxton) said he offered any remarks on the subject with diffidence, but the practical point lay in the application of remedies for the relief of the condition of high blood-pressure. The valuable contributions hitherto submitted had not dealt much with this aspect of the case, but offered a basis upon which a system of treatment could be constructed. Some of the points mentioned deserved emphasis, while some called for contradiction. In pointing out the

value of subthermal baths in reducing early high tension, Dr. Fox alluded to a most important function of spa treatment in dealing with the conditions under discussion. At one Continental spa a speciality was being made of treating early cases of high blood-pressure, and the secret of the treatment seemed to be baths of short duration, starting at about body temperature, and reduced to skin temperature. As usual, physicians in England were somewhat behind their Continental brethren in making use of spa treatment, but he asked whether those spas which had made their reputation in treating gout had not done so on the same principle, without appreciating the actual mechanism of the "cure." That had been the case in Buxton in regard to gouty patients with high arterial tension, and he believed the success attained was attributable to the effect of the baths upon high blood-pressure quite as much as to the excretions of toxins which drinking the waters would bring about. Dr. Leonard Williams, at the last meeting, stated that there were no diuretic waters in England of any value for treatment of high blood-pressure, and that therefore it was necessary to go to Evian or other Continental spas to get it so treated. He (Dr. Buckley) began to wonder whether it was not time that there was a scheme providing for members to travel to the various British spas, analogous to the "*Voyages d'Études Médicales*." The chief function of the waters at Bath and Buxton was diuretic, tending to the elimination of such toxins as had the effect of raising blood-pressure, and he believed that was the case with the magnesia spring at Harrogate. After the last meeting one doctor from Harrogate illustrated that diuretic effect very clearly by a story, which he regretted he was not present to repeat; it was very convincing. There was no need to send patients with high blood-pressure to the Continent, for in England there was every form of treatment which was available on the Continent. These should be fully used, and brought more up to date. His remarks had been empirical rather than scientific, but he hoped they might have some practical value.

Dr. WILLIAM EWART referred to the subject of tortuosity,

which had cropped up in the discussion, and had been mentioned by the opener of the debate. It might be too readily dismissed as an uninteresting side issue. But, like most details in the great works of Nature, when looked into it assumed growing proportions, and inevitably led on to questions of primary importance. Considerable significance might, therefore, attach to the simple fact which he had observed, that tortuosity of some of the arteries was sometimes found in subjects whose blood-pressure was not high, either as felt by the finger or as determined by the blood-pressure gauge. What is the meaning and the derivation of this tortuosity of hypotensive arteries? We are at once led to think of individual peculiarity. The calibre of veins varies in different individuals, in some small, in others so large that it may approach to varicosity. The same variety might obtain in regard to arteries; and so the tortuosity often ascribed to disease might be quite consonant with health, and be simply a congenital peculiarity. In some, however, this feature is not congenital; and it is always less noticeable when the subjects are young than later. The question thus raised as to the causation of tortuosity might possibly find its answer in a relative lack of proportion between the pressure inside the vessel and the resistance of the vessel-wall. The disproportion might consist either in there being continually present too high a pressure of the blood, or in the vessel being too weak in respect of the higher pressures developing at times within it. The practical difficulty arises that while any observer can believe in his sensations in feeling the pressure, others may not place the same trust in his personal estimate. On the other hand, we look in vain to instrumental aids for an absolute verdict, because our present instruments do not record the entire series of pressures. Whilst they indicate that at a certain time a maximum is reached, they do not show the duration of the high levels which may be long sustained immediately below, and which it is so important not to overlook. A pulse-pressure gauge to meet that need is badly required, and we hope that ingenious minds will devote themselves to finding it. With

regard to this form of tortuosity, it seems to him likely that the systolic pressure may be too high for a lax vessel, and that the very fact of this laxity afterwards causes the vessel to retain too large an amount of blood. This opens up another aspect of the problem, that of the relation between the cubic capacity of the arterial system, with its variations, and the superficial area of muscular fibre and elastic fibre concerned in controlling the contents. The study of tortuosity might thus induce physicians to learn a great deal about the arterial system, about the mechanism of the variations in blood-pressure, and therefore also about the most suitable treatment of cases in which the blood-pressure is found to be abnormal.

The CHAIRMAN said he did not hear Dr. Edgecombe's paper, and therefore his remarks would have reference to what had been said by Dr. Fortescue Fox and subsequent speakers. Dr. Fox said that abnormalities of blood-pressure were due to vaso-motor disorder; and with that everyone would agree, though he was not sure that it carried them far on the way. Dr. Fox also alluded to the important subject of individual variation in regard to compensation. He had often tried to explain to himself certain well-known facts in comparative physiology. He did not know why it was quite immaterial to a woodpecker whether he was upside down or not. And the blood-pressure arrangements of marine living mammals must be quite special, seeing that they had to take in their supply of oxygen during a very short time and make it last for a long time. The sloth was another animal which had excited his vaso-motor curiosity—why it preferred the extraordinary posture it usually adopted. The fact brought forward by Dr. Mantle, that blood-pressures generally tended to be lower in hot weather, seemed to introduce doubt as to how one was to standardize blood-pressures. If during a hot summer, blood-pressures were lower, and during a cold summer they were higher, it was difficult to know what the pressure should be in a moderate summer. As Dr. Mantle had also said, the time of taking the pressure was important; he was, no doubt, referring to the time since taking meals or stimulants. With regard to tortuosity, upon which

Dr. Ewart had dilated, he, Dr. Street, did not see how tortuosity could be due to too high a systolic pressure, when it was, as he said, a common characteristic of veins, in which the question of systolic pressure could hardly be considered. He, Dr. Street, could not think that a very tortuous vein, such as was commonly seen in the lower extremities, could be an entirely healthy one. But he did not know by what mechanism tortuosity was produced.

Dr. Edgecombe, he regretted, could not be present that evening, but it would be agreed that his paper was exceedingly interesting.

Dr. FORTESCUE FOX, in replying on the discussion, said he was sure all would regret Dr. Edgecombe's absence. He had hoped he would have been present to deal with some of the points on which he had ventured to differ from him. He was glad, however, that the discussion that day had evoked some expression of opinion, and particularly Dr. Buckley's, and he was glad to find that he, at all events, realized the great importance of baths at or below blood heat, especially in the treatment of diseases of the circulation. There were many places abroad where the treatment by sub-thermal baths was traditional, but in our country it had been strangely neglected. And at the great thermal spa at Bath, where the Society met some time ago, there was no one who was able to describe to the Fellows the effects of sub-thermal baths. In future, now that attention had been directed to circulatory disorders, he had no doubt that much would be heard about them. He had been interested in what Dr. Bergouignon, of Evan, had just told him privately, that at his spa in France blood-pressures were in the early stages undoubtedly reduced by sub-thermal bath treatment. And his observation agreed with that of all English balneologists that in the later stages, when structural change had supervened, one could not hope for much reduction of pressure under spa treatment. Thus the moral was brought home with irresistible force that in the early and spastic stages of hyper-tension balneological treatment should be perseveringly and repeatedly applied. He was interested in Dr. Ewart's remarks in connection with tortuosity of blood vessels. Those conditions were, however,

in Dr. Fox's opinion, to be attributed to vaso-motor disorder (focal or general), and only to be treated from the point of view of the nervous system. He expressed his indebtedness to the Fellows for their kind attention.

Sir CLIFFORD ALLBUTT writes : I have read with peculiar pleasure the paper by Dr. Edgecombe. After preaching in the desert for twenty years that arterio-sclerosis is not "a disease," that even in morbid anatomy it is not single, and in clinics is a various result of many diseases—toxic, hyper-pietic or senile—it is at length a great satisfaction to find disciples, and now in many independent directions. On the whole I agree with Dr. Edgecombe's statements and conclusions; and many of them interest me much, so that I have ventured to make a few extracts for future use, with all acknowledgment. One of them is my old maxim, now supported by Dr. Mitchell Bruce, that enhanced arterial pressures are not general in articular gout, not characteristic of it. Another very practical maxim, yet one which seems very difficult to drive home, is that hyperpiesis, if caught in time, is a curable disease; surely a most pregnant maxim, both in the protection and maintenance of life and in the interpretation of arterial diseases. The most contestable point is that by diet calcification can be averted. In the first place, calcification of the media is not "arterio-sclerosis" in the usual sense of this name, that is in the sense of the sub-intimal process described by Thow, Jores and others; secondly, I do not know that if the media has entered upon the stage of necrosis leading to calcification this change is any further detriment. Indeed, Ludwig Weil's experiments indicate that thereby the vessel is even fortified. In any case, to try to prevent it by niggling at the lime in the food is (as I have said before) like "taking away a man's cash and leaving him his cheque-book."

Professor HUCHARD, of Paris, writes : As I have the honour to be a corresponding member of the Society, I may perhaps be allowed to contribute a word on the subject which I believe is to occupy the Society at its next meeting, a subject which has deeply interested me for many years past, namely, the indications of natural mineral waters in the various

affections of the heart and blood-vessels. What I have to say resolves itself into something in the nature of a protest, which I venture to submit in the double interest of sufferers and of science. This protest is directed primarily against the tendency, which I regret to see shows no signs of diminishing, towards recommending all cardiac patients indiscriminately to the same health resort ; a health resort which may be described as arrogating to itself the title of a panacea for all cardio-vascular derangements ; which has, if we are to believe its own claims, a singular power of healing or ameliorating both high blood-pressure and low blood-pressure ; valvular heart disease, and heart disease secondary to arterial troubles ; cardiac functional disturbances of all kinds and descriptions ; true angina pectoris, and false angina pectoris ; dilatation of the heart and cardiac hypertrophy ; real heart disease, and false heart disease ; those suffering from hypostole, and those suffering from hypersystole ; those who are burdened with breathlessness, and those who are not, and so on. I desire most emphatically to protest against the abuse of a form of treatment which is liable to the greatest possible dangers, which has indeed already claimed far too many victims. In health resort treatment, as in other therapeutic endeavours, we must above all things obey the indications which the state of the patient presents, and these differ not only in different individuals, but more especially in the different varieties of cardiac affections, and the different stages in which those affections first present themselves to our notice. That is a matter which I need scarcely insist upon in addressing my *confrères* in England, where, what I may call the clinical or therapeutic instinct is so well and so scientifically developed.

In France we have six spas with carbo-gaseous waters upon which we place great reliance in regulating the work of the heart, but we endeavour to prescribe those stations according to the particular kind of disorder which may present itself in an individual case. The spas are Châtel Guyon, Chateaufort, St. Alban, St. Nectaire, Salins Moutiers and Royat. The two latter are especially prized with us for their influence upon arterial tension. Their waters have a temperature of

from 35-36° C. (95-97° F.), but, as I have already said, we are careful not to prescribe these stations indiscriminately, believing as we do that the selection of a spa should be dictated purely by therapeutic indications.

Bourbon Lancy has thermal water from 105° to 120° F., which are eminently radio-active, furnishing, according to the recent work of Mouren, no less than 8,000 litres of helium per annum. It has a special value in cardiac troubles of rheumatic origin, and in almost all functional cardiac manifestations.

Royat, which has carbo-gaseous waters at a temperature of 95° to 97° F., is useful more especially in the treatment of what in France we call pre-sclerosis, and other deviations from the normal arterial tension.

Brides-les-Bains and Salins Moutiers also have carbo-gaseous waters, which exercise a stimulating effect upon hepatic metabolism. These stations are exceptionally useful to those sufferers from heart disease whose disabilities are complicated and emphasised by obesity.

Evian has highly diuretic waters, and is eminently useful in disposing of hypertensive toxins by way of the kidneys.

Vittel has also diuretic waters, which in certain doses are also laxative. It is more especially indicated in vascular troubles which are definitely of gouty origin.

Bagnoles de Lorne, Luxeuil, Plombières, are all admirable stations in cases where the venous rather than the arterial system is attacked.

Finally we should not forget Bagnols (Lozère), which is now being reconstituted and renovated, and whose waters are as strongly indicated as are those of Bourbon Lancy for those recovering from the effects of rheumatic endocarditis.

Such are, briefly, the considerations which I would have developed more fully had I been able to carry out my original intention of coming to London for this meeting of the Society. I regret my inability to do so the more sincerely as I had looked forward to making personal acquaintance with some of my able and distinguished English *confrères*, the value of whose work on this and allied subjects is so highly appreciated in France.

Original Communications.

PRESIDENT'S ADDRESS.

BY THOMAS DARLINGTON, M.D.
NEW YORK CITY.

It is with a deep and sincere appreciation of the honour you have conferred upon me that I speak to you to-day. The record of this Association is an honourable one. The work you have accomplished is a sufficient guarantee of your earnestness of purpose, and it has been your privilege and pleasure to contribute in no small measure to the alleviation of the physical ills of mankind. The duties of this position are a welcome change from the pressure of political life, and I render to you all my most grateful thanks in selecting me for a position held by so many worthy men.

It is therefore in no spirit of criticism that I venture to bring before you suggestions for future achievements, but rather with the purpose of appealing to that spirit of progress which is such a fundamental verity of our profession, and which has characterised the efforts of those whom we delight to honour.

As an Association, are we not drifting toward specialisation in our work? Our tendency has been to focus a large share of our attention upon pulmonary tuberculosis; worthy and important as that subject is, let us not forget that there is other work to be done.

Times and manners are not immutable, but it behoves us to occasionally glance backward and refresh our minds with the calm philosophy of the ancients. Socrates quotes the eminent physicians of his time as saying that "they cannot cure the eyes by themselves, but that if the eyes are to be cured, the head must be treated," and then again that "to think of curing the head alone, and not the rest of the body also, is the height of folly. And arguing in this way, they apply their methods to the whole body, and try to treat and heal the whole and the part together."

Metaphorically, may we not apply this to ourselves? The object of our Association as stated in the Constitution, limits us in the letter only; not in the spirit. We have a wide range of subjects for consideration. The profession as a whole is making rapid strides and even since our last meeting there has been a marked change of thought in regard to the climatic treatment of tuberculosis, and in what is perhaps of greater purport, the studies made in reference to serum therapy and the opsonins.

This Association has contributed more toward the elimination of tuberculosis than any other Society. In all probability the results of home treatment and of Sanatoria located in cities would never have been attained but for your efforts in bringing out the facts relating to the rational and hygienic methods of the treatment of the disease.

There is a growing tendency to promote the virtues of hygienic home methods in the treatment of tuberculosis at the expense of climatic treatment; the latter still has an important place, but other methods are pushing to the front and must be considered.

The fresh air treatment of tuberculosis is now a formidable rival to the purely climatic cure. Without decrying my own city, it must be admitted that New York has a variable and most trying climate, yet we have a sanatorium for consumptives situated on North Brother Island. This Island stands at the junction of the East River and long Island Sound, near that region very properly called Hell Gate. The climatic conditions at this point are distinctly unfavourable, and the patients received are mostly those afflicted with an advanced type of the disease. They are recruited from a class in whom good hygienic surroundings are at a discount; in fact, from the lowest strata of the "submerged tenth," yet the systematic routine of hospital existence, the outdoor life and good food, give us results that are most encouraging. Apparently hopeless cases are being cured, and this is taking place despite climate, not with its aid.

The advantage of curing patients in the climate in which they must afterwards live, and the elimination of that most

dreaded complication "nostalgia," are results of prime importance. No climate, however favourable, can avail much if home-sickness develops and the questions of the financial status of the patient and his future life are of too great significance to be overlooked. A contented mind is a therapeutic adjunct of the utmost value, as we have all had abundant opportunity to observe. I wish again to quote Socrates: "That as you ought not to attempt to cure the eyes without the head, or the head without the eyes, so neither ought you to attempt to cure the body without the soul."

Another instance, worthy of mention, is the remarkable results attained in the treatment of bone tuberculosis by the same methods. The Sea Breeze Home at Coney Island and the Junior Home on the Bank of the East River, almost in the heart of New York City, have shown wonderful results.

Here I shall digress for a few moments to speak of the need of more work along the line of the mode of infection of pulmonary tuberculosis. The point I wish particularly to emphasise is the question of intestinal infection caused by the ingestion of infected food. The questions of infected milk, meat and other food, have received a large share of attention, but less stress has been laid on the possibility of food becoming accidentally infected from contaminated hands. The wide distribution of the tuberculosis bacilli and the number of people suffering from the disease, render it extremely probable that direct hand to hand contact with other people, as well as the handling of any articles which may be infected, give us a potential source of infection of the food we handle and eat. If typhoid may be carried this way why not tuberculosis? For the purpose of showing the
* evident possibilities of infection in this manner I wish to present a report of an interesting case which has recently come under my observation.

In making an investigation as to the cause of several simultaneous cases of typhoid fever occurring in one family in New York City, Dr. George D. Soper elicited the information that the cook employed by this family had lived in four different families during the period from 1902 to 1907, and in each

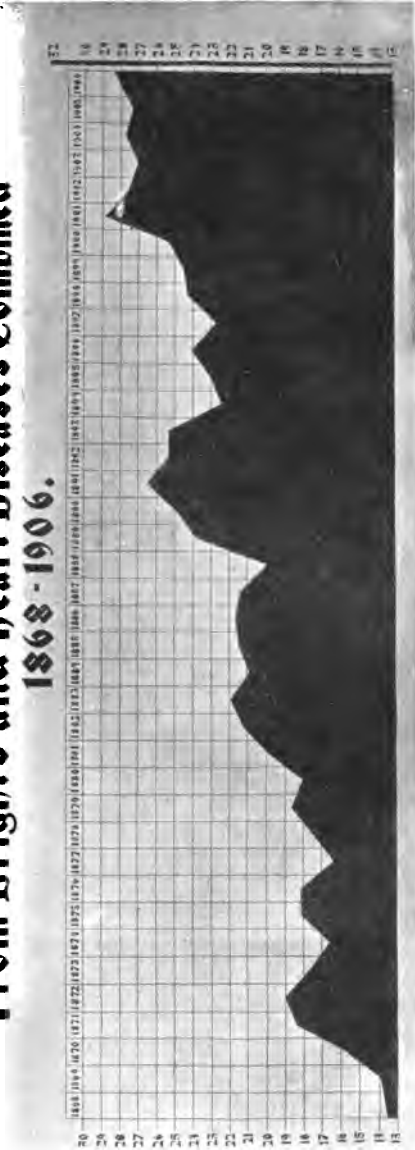
instance it was discovered that from three to four weeks after the cook had entered upon her duties, practically all the members of each household were stricken with typhoid fever. In all twenty-eight cases of the disease were traceable to this source. The Board of Health removed the cook to the Reception Hospital for observation. She denied having ever had the disease. Examination of the blood and urine was negative, but the bowel discharges were found to furnish practically pure cultures of the typhoid bacillus. The woman has now been under observation about six weeks. At intervals of a day or two the fæces are clear, but this intermission is invariably followed by discharge containing the bacilli in practically unlimited quantity. We do not know for how long a period this condition has persisted nor how many other cases of the disease may have emanated from this source. The mode of infection is clearly indicated by the woman's occupation, and is a sad commentary upon her personal habits of cleanliness. The lesson is one which should be heeded.

Is it not a fact that the tubercle bacillus has the power not only to penetrate the intact epithelium but also the entire wall of the gut, all without leaving a recognisable trace of its passage? The acidity of the gastric juice may impair the vitality of the bacilli, but this is offset by the alkalinity of the intestinal secretions. The bacilli are then taken into the lymph channels, the various groups of glands may become affected, and the bacilli find their way into the thoracic duct and so directly into the pulmonary circulation. The frequency of the sites of tubercular lesions is pertinent. In regular order we find the lungs, liver and brain the most prominent sites of the lesions. Macfayden and MacConkey, in their researches, speak of the intestines of children as a more important mode of entry for the tubercle bacilli than the tonsils or adenoids.

When the probable frequency of this mode of infection is considered, we may well take cognisance of the accidental food contamination from infected hands.

We have but just begun our fight with this plague, and

Death-Rate Per 10,000 Pop. Old City of New York < Present Boroughs of Manhattan and the Bronx > From Bright's and Heart Diseases Combined 1868-1906.

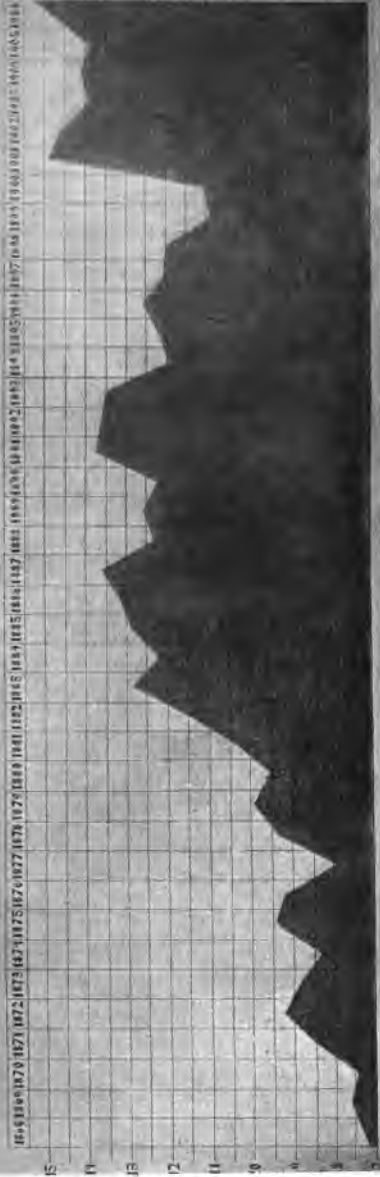


Death-Rate Per 10,000 Pop. Old City of New York

< Present Boroughs of Manhattan and the Bronx >
From Bright's Disease
1868-1906.



**Death-Rate Per 10,000 Pop.
Old City of New York**
< Present Boroughs of Manhattan and the Bronx >
**From Heart Disease
1868-1906.**



with these new weapons of warfare our chances of success are brightening, but in our efforts for victory in this line we must not be unmindful of the other enemies that assail us.

The questions of climate, fresh air and proper environment in their relation to other diseases of the thorax, are insistently demanding an answer, and the correlated circulatory diseases need further study and elucidation. I wish briefly to call your attention to the existing conditions and the potential possibilities of this Association in research along these lines. The problems are for you to solve; my efforts are merely directed towards suggestions for future work.

We are confronted with the increased mortality from heart and kidney diseases. This increase is particularly noticeable in our cities, and the diseases are mentioned together because of their intimate etiological relation. These charts show most graphically this increase in New York City, and a mere glance at them should bring us to a realising sense of its importance.

Without considering the actual number of deaths, I wish to call your attention to the death-rates in a number of cities of the United States. The figures given are for the death-rate per 10,000 population. It has been found practically impossible to obtain statistics covering the same lengths of time in all cities, but the tables presented are sufficiently comprehensive to prove the truth of the contention.

HEART AND BRIGHT'S DISEASE.

			Heart Disease.		Bright's Disease.		Combined Death-rate.
Boston, Mass.							
	1880	...	11'71	...	6'23	...	17'94
	1905	...	18'17	...	9'54	...	27'71
New York, N.Y.							
	1880	...	9'54	...	8'51	...	18'05
	1905	...	13'90	...	13'37	...	27'27
Chicago, Ill.							
	1880	...	6'20	...	3'55	...	9'75
	1905	...	10'60	...	10'13	...	20'73
New Orleans, La.							
	1881	...	16'48	...	5'21	...	21'69
	1905	..	21'95	...	17'30	...	39'25
Washington, D.C.							
	1896	...	14'20	...	6'68	...	20'88
	1904	...	18'26	...	11'91	...	30'17

		Heart Disease.		Bright's Disease.		Combined Death-rate.
Philadelphia, Pa.	1898	... 11'24	...	8'34	...	19'58
	1905	... 13'59	...	13'73	...	27'32
St. Louis, Mo.	1895	... 9'07	...	5'21	...	14'28
	1900	... 9'61	...	6'51	...	16'12
Milwaukee, Wis.	1894	... 5'93	...	3'19	...	9'12
	1905	... 10'81	...	5'67	...	16'48
Cincinnati, O.	1882	... 7'51	...	2'37	...	9'88
	1889	... 8'72	...	2'73	...	11'45
Denver, Col.	1895	... 6'00	...	4'21	...	10'21
	1898	... 8'86	...	5'27	...	14'13
Atlanta, Ga.	1893	... 7'95	...	1'93	...	9'88
	1900	... 6'31	...	2'44	...	8'78
Macon, Ga.	1892	... 4'64	...	1'22	...	7'86
	1894	... 4'29	...	3'57	...	7'86
Omaha, Neb.	1893	... 4'40	...	1'61	...	6'01
	1897	... 3'80	...	1'80	...	5'60
Sacramento, Cal.	1895	... 9'33	...	2'00	...	11'33
	1897	... 9'50	...	1'50	...	11'00

The most marked increase is shown in Boston, Mass., where the rate from heart disease was 11'71 in 1880 and 18'17 in 1905, while New Orleans, La., gives the greatest increase in the mortality due to Bright's. The rate in this city was 5'21 in 1881, and 17'30 in 1905. While Atlanta and Macon, Georgia and Omaha, Nebraska, show a slight decrease in the death-rate from heart disease for the short periods of time in which statistics are available, it is worthy of note that in every city investigated, except Sacramento, the rate from Bright's has shown an increase.

One cannot fail to be impressed with the import of these figures. In giving them even a casual consideration, three factors are worthy of note. First, the persistently high death-rate and increase in heart disease in New Orleans, and the great increase in the mortality rate from kidney disease in the same city; second, the decrease in the heart death-rate in the Georgia cities; and third, the great general increase in the combined death-rate in the two diseases. Using the complete tables, from which these figures were taken, as a basis, it is

evident that the death-rate from these diseases in the cities of Boston, New York and Chicago, has nearly doubled in the twenty-five year period, while the general death-rate has shown a decided decrease. In these same three cities, the actual number of deaths from these diseases was 3,287 in 1880 and 12,243 in 1905.

The mortality statistics of the Census Bureau for the five-year period from 1901 to 1905, inclusive, covering the States of Connecticut, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Rhode Island and Vermont, show an average general increase in the death-rate from heart disease of 2.05 per 10,000 population, and an average general increase in the death-rate from Bright's disease of 1.31 per 10,000 population. The increase has been general throughout all of these States; New Hampshire showing the greatest combined increase, with Massachusetts a close second. The highest death-rate from heart disease is shown by Massachusetts, with a rate of 18.47, while New Hampshire has a rate of 18.25. Indiana has the lowest rate from both diseases—10.26 in heart disease and 5.73 in Bright's.

A study of the causative factors of this alarming increase naturally suggests the part played by the many so-called features of city life, and one of the most important factors in the relation of mental strain to the production of functional, followed by organic lesions of the heart and, subsequently, the kidneys. The high wrought, over-nervous activity of the modern city business man and the equally strenuous social whirl of the city woman; the mad rush of competition; the bustle, confusion, noise and unrest, so striking in comparison with the *dolce far niente* of the business and social life of a century ago; crowds and hurry; elevated stairs and "rapid fire" elevators; mental strain and physical bankruptcy; all seem so essential. They have come to be considered a striking characteristic of our national life, yet they are so deadly to our individual life that they furnish us with food for deep and earnest thought.

As a people, we are mad with the lust of success and money getting, and individually suicidal in our craze for material

advancement. The spirit which prompts 11 p.m. editions of the daily papers to be on sale at 11 a.m. is clearly indicative of sufficient cause for the appalling increase in deaths from heart disease.

The vice of hard drinking is less prevalent than it was in the days gone by ; we cannot lay the blame for our chronic Bright's and hypertrophied heart cases wholly upon its overburdened shoulders. Drunkenness is less common, but stimulation is on the increase.

The quiet and calm of sylvan life is within the grasp of few of us, but rational right living, hygienic precepts and the law of physical and mental repose are doctrines which must be forcibly brought home in order to cope with this menace. Proper climate may be a chimera, but fresh air is always available ; country life may be a glittering will-o'-the-wisp, but physical and mental calm are within our reach. The strenuous life brings in its train deadly consequences. As Gladstone says : " Medicine must more and more come to be not an art only, but also a philosophy." Let us then preach the doctrine of the restful life, the doctrine of individual self-poise and mental and physical well-being.

In our self-constituted task of decreasing the death-rate from germ diseases we have admirably succeeded ; but are we not tending to narrowness in our efforts ? Our knowledge of the physiology of the heart and kidneys ; our methods of physical diagnosis in ascertaining their deviation from the normal and our efforts in the line of prophylaxis of disease in other directions. The relation of influenza to the causation of cardiac difficulties should be investigated. Here is a vast and almost untilled field before us. The plough of scientific inspiration is needed and the seed of demonstrable results should be planted. It is a chance for the highest endeavour and for the accomplishment of a boon to mankind.

Among the infectious diseases, pneumonia demands attention. The problem is not quite so serious a one as in the case of heart and Bright's diseases. Our knowledge of the etiology of pneumonia has greatly advanced, yet we have only recently made any progress in our attempts at its alleviation and cure.

Death-Rate Per 1000 Pop. Old City of New York

< Present Boroughs of Manhattan and the Bronx >

From Pneumonia and Pulmonary Tuberculosis

1870 - 1906



Drug treatment *per se*, is assuming less and less importance, and we are doing little else than assist Nature in the treatment of this disease. Our hope of specific medication seems to lie with our collaborators in the field of serum therapy. In the meantime, are we not too quiescent in our attitude towards general prophylaxis and the methods tending to eradicate the disease?

Pneumonia as a cause of death has been second only to pulmonary tuberculosis. Now it has outranked even that "Captain of the Men of Death," and this chart shows the situation as it exists in New York City.

Computations based upon the latest census reports indicate that there were almost 140,000 deaths from pneumonia in the United States during 1905. If we allow a case mortality rate of 20 per cent., we may assume that there were 700,000 cases of this disease during the year.

During the five-year period, from 1896 to 1900, the death-rates from pneumonia and bronchitis, collected in various countries and cities, are given in the following table:—

PNEUMONIA AND BRONCHITIS.

						Rate per 10,000 of Population.
England and Wales...	...	...	...	...	...	22.70
Scotland	...	...	...	...	...	27.40
Stockholm	...	...	...	...	...	26.70
London	...	...	...	...	...	31.20
Berlin	...	...	...	...	...	16.10
Vienna	...	...	...	...	...	39.70
Christiania	...	...	...	...	...	21.30
Boston	...	...	...	...	...	30.60
Chicago	...	...	...	...	...	24.20
Philadelphia...	...	...	...	...	...	25.10
New York	...	...	...	...	...	36.60

During the period from 1881 to 1904, pneumonia increased or remained stationary in all of these places except Stockholm and Berlin.

In this country, in the ten States where vital statistics are accurately recorded, there was a general increase in the number of cases during the period from 1900 to 1904. In 1905 the number of deaths markedly decreased, while in 1906 an upward tendency in the death-rate has again been apparent.

In all of these States, the death-rate in the cities has been, and is, persistently higher than in the rural regions. This condition is not peculiar to this country, for the Registrar-General's report of 1902 states that in England and Wales the city rates were in excess by between 80 and 90 per cent. The etiological factors I have mentioned in connection with heart and Bright's disease are of equal importance here, and, in addition, the importance of the constant inhalation of dust, smoke and other irritating foreign particles, merits attention. We must all recognise the value of pure, fresh air in the treatment of pneumonia, but have we sufficiently studied the value of pure, fresh air in its prevention ?

The question of climate in its relation to the prevalence of this disease should receive more attention than it has so far. It would be of vast interest to know the exact climatic conditions, temperature, humidity, altitude, and state of the soil in those fortunate localities where pneumonia is practically non-existent.

You may remember that the Esquimaux brought back by Commander Peary from the Arctic regions in 1898, practically all succumbed to pneumonia soon after reaching New York, yet the disease is unknown in their home climate.

During a recent lecture, Peary made the statement that during his last trip to the far north, none of his party suffered from coughs or colds, yet they lived for many months in a temperature of from 25 to 75 degrees below zero. Since their return to this country they have all suffered from respiratory troubles.

The Medical Commission appointed by the Board of Health of New York City in 1904 for the purpose of investigating the causes of the acute respiratory diseases, was composed of eminent men. Much time and scientific effort was expended in the study of these diseases, particularly pneumonia. The scope of the work was extensive and comprehensive and much valuable information was obtained. The problem, however, was found so intricate that no ultimate conclusions were reached. Much remains to be done to supplement this work, for we are yet only on the threshold of achievement.

These problems are urgent. We would be but following the object of our Association if we devoted more time to this consideration. It is essential that we keep clear of stereotyped methods if we are to fulfil our highest aim and purposes.

In this short outline I have been able to briefly call your attention to a few vital needs of the times. If I have succeeded in impressing you with the need of renewed efforts along these lines, I shall feel that much has been accomplished, for the record of the American Climatological Association is inspiring indicative of what the future holds in store.

THE SLEEPING CANOPY.

DESIGNED TO AFFORD TENT ADVANTAGES INDOORS, WITH
BRIEF REMARKS ON THE NEED OF SUCH MEANS OF
VENTILATION.

BY CHARLES DENISON, M.D.
DENVER, COLORADO.

THE prominence now given to the outdoor treatment of tuberculosis, and the great need of reform in the ventilation of our houses, fundamental, I believe, to the success of the present tuberculosis crusade, are reasons sufficient for my presenting this kind of paper to the American Climatological Association.

The object of this experimenting with bed canopies has been to devise a substitute for the sleeping tent which can be easily and cheaply made, by the invalid himself if need be, and which will furnish practically out-door sleeping, yet in a warmed house or bed room.

The invalid may thus, tentatively, experiment with more and more air; the window may be partly or wholly opened. The sleeper when he arises in the morning, or, if he has to get up at night, comes from his tent into a warm room. If economy in room space is a desideratum, the canopy, when not in use, can be pulled up by its frame to overlay the casing of the window and there remain until it is again needed. If the bright sunshine in the morning needs to be shut out, so as to prevent waking the sleeper, or greater privacy from the neighbours is desired; or if the invalid wants to have the great advantage of sun baths, with or without oil rubbings, at suitable times during the day, a dark window shade may be provided to unroll from near the window sill and to stop at any height desired, as in most physicians' offices. The canopy curtains can be made large and long enough to encircle the exposed sides of the bed, reaching to the floor, and in front be buttoned or be fastened to each other with hooks and eyes or safety pins; also, they can be tucked under the mattress, so as to shut out all violent draughts or winds.

The curtains are tacked to the outer rim of the inside

window casing under and close to which the bed is moved either parallel to the window sill, or *head on*, as shown in the accompanying pictures. These illustrations show here how easily the arrangement can be made to fit a 4-foot wide window frame, and reach over and enclose an ordinary single brass bedstead 41 or 42 inches wide. For double beds or wider



FIG. 1.—THE SLEEPING CANOPY.

Curtains closed in over head of bed, same as when in use at night.

windows its dimensions will require but little changing. Such an ordinary window, say 3 feet wide, when only half closed, with the sleeper so near the opening, will give as much as, or more ventilation than a tent with one-half the front fly thrown back, and if a storm or wind comes up, the ventilation, if excessive, can be regulated to suit. It may thus serve as an

educator or coaxer to induce invalids to appreciate and like out-door sleeping.

The freshness of the out-door air is almost as apparent as when sleeping on an open porch, so near to the occupant's face is the ever changing atmosphere. The same exhilaration is felt on awakening in the morning, as when arising from a cot in an open tent.



FIG. 2.—THE SLEEPING CANOPY.

Curtains draped over iron wire frame extending out past the side of the bed, which is made up lengthwise under the window. At night, curtains are tucked under ends of mattress and fastened together in front, enclosing occupant free from draughts.

Why is not out-door sleeping more popular?

Why should not a delicate person, an invalid, or convalescent, take kindly to and adopt such a provision for his or her sleeping hours? Two reasons suggest themselves:—

(1) Because of the unreasonable or exaggerated fear of a draught.

(2) Ignorance of its suitability for his special needs.

First, as to this draught question. It is not the *draught* element, the same as I think it is not the germ caused in tuberculosis, we ought to think about, as much as it is the



FIG. 3.—THE SLEEPING CANOPY.

Curtains thrown back from over head of the bed to show iron frame in position and top sash of window down beyond.

susceptibility of the individual. A camper in the Rocky Mountains can get so inured to the draughty air, that he can sleep on the ground with the wind blowing twenty to forty miles an hour, and not think of "catching cold." The habit of exposure at night in a room with the windows all open, has many times stopped night sweats which drug remedies alone

had not been able to control. So, here a sleeper, by having warm enough coverings on the bed and a thick woollen hood on the head in winter, or a light, soft night cap in mild weather, can so temper the air movement (for one will, of course, feel it coming down on his face) that no danger of "catching cold" will result.



FIG. 4.—THE SLEEPING CANOPY.

Curtains over iron wire frame drawn up against the wall by strong cord extending through ring or pulley fastened to picture railing.

As to the second reason, lack of appreciation or ignorance, we ought to have a rule of *space per capita* for sleeping purposes that would be so advocated and enforced (by legal enactment if necessary) that no one could plead ignorance, or be charged with it, as an excuse for unappreciation of the

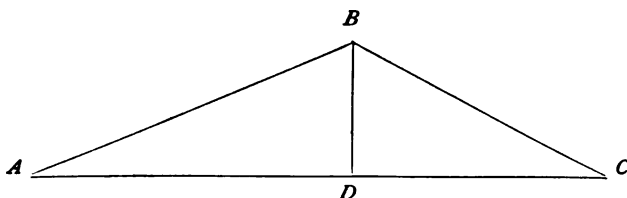
relation of *air space to health*. This rule should, of course, carry with it the condition of renewal per hour, as a compensation or compromise for lessened space. For instance, if Parke's conclusions ("Practical Hygiene") in favour of "3,000 cubic feet space per person, renewal once per hour" be taken as the rule, then a sleeping room with one-tenth that space should be renewed ten times as often. Our sleeping canopy with one-thirtieth that space, namely about 100 cubic feet, roughly estimated, should have a renewal capacity thirty times as often, or once in two minutes. It probably exceeds twenty times this, or once in five seconds, and is surely on the safe side of the strictest rule for health that any one, even the most exacting, would suggest.

This question of the necessity of sufficient air space, especially during the probably more susceptible sleeping hours, is, in my judgment, the most vital one to consider in connection with the present tuberculosis crusade, not second in preventative importance to the quality of air in that space, nor to the infective germ of tuberculosis. I believe it is a mistake to hold (as was done in a recent discussion of the question) that tuberculosis is a "house disease" because of the concentration (*i.e.*, the increased opportunity for infection) of germs therein, rather than because of the cramped and limited air supply. If this germ explanation is to prevail, there will be small hope of eliminating tuberculosis with all the restricted measures you can muster. There is a natural, perhaps I ought to say, yet undiscovered law of ventilation, which will then continue to be broken. There is the limitation to lessened air space in sleeping and living rooms, beyond which unhealthfulness commences, and this will remain unchanged. There is a point of departure in environment where susceptibility and predisposition to this disease find their conception and birth. Tuberculosis is the outgrowth of this faulty environment, and on this *post hoc* microbic explanation of its house relation the disease will continue to thrive. We might as well try to eradicate the mould and moss from a Louisiana swamp jungle, without letting the sunlight and plenty of dry air in there, as to try to prevent tuberculosis, without changing the environment of its origination. I am, therefore, opposed to this germ

explanation, this prevailing disinfectant idea, as the sole battle cry against tuberculosis, because it is wrong. It is misleading, luring us away from knowing the value of perfect ventilation.

I will try to describe this canopy, so that anyone, by following these directions, can make it to suit his own individual conditions.

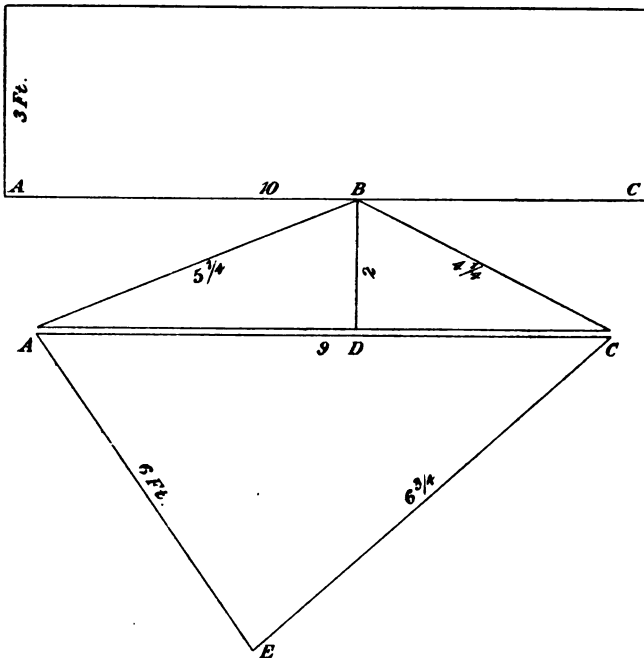
First.—As to material. Yard wide "Denim," because it is closely enough woven to stop the wind, resembling tent cloth or duck in this respect, and because it comes in various colours and designs, has seemed to me the preferable material. Besides, it is less expensive than good duck cloth. In determining the amount of cloth needed, from 1 to 2 ft. (according to the width of the bed and the height of the top of the window frame) should be added to the distance from the top of the window casing down to the floor, and let this sum be the length of the front facing of each curtain. Supposing the height of the window casing from the floor is $8\frac{1}{2}$ ft., and



the width of the window casing 4 ft., then the height of wire frame is $5\frac{1}{2}$ ft., and width 4 ft., the two front pieces of the curtains being 10 ft. long and 3 ft. wide. Cut out two strips as follows, and $A B C = 10$ ft., $A D C$ being a straight edge, and $B D$ being 3 or 4 ins. more than one-half the distance of the wire frame from the wall. This makes $B D$, say, 2 ft., and $A C$ 9 ft., $A B$, representing the height of the frame from the floor C , will come to the top of the canopy. Sew $A B C$ to outer edge of each front 10 foot strip, and to $A D C$ sew a triangular strip $A C E$ made of half a rectangle, the hypotenuse of a triangular half of which is equal in length to $A D C$ and the ends of which rectangle are $2\frac{1}{2}$ ft. more than the width of the bed. This enables the curtain to reach around the mattress and lap over the opposite curtain in front. This will make the square mentioned 6 by $6\frac{3}{4}$ ft., which is to be cut through diagonally from corner to corner the long way.

Then we have the following three pieces of which to make each curtain. About where needed in this curtain, there will be a bulge or pocket for the corner of the supporting frame.

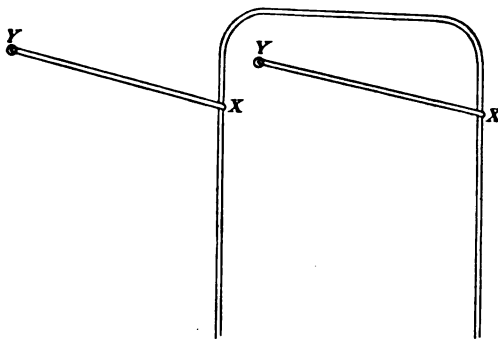
Allowances can be made for seams and hems, as well as for wider, narrower, or taller window casings, as well as for a double bed.



(Note.—If one doesn't mind about the curtains not fitting the frame exactly, the making of the sides (after the front lengths are cut off) can be very easily done by next making a square, the hypotenuse of a triangular half of which equals the length of a front piece. Sew the long sides of these two halves to the sides of the front lengths to make the two curtains).

As a cheap substitute for the wire supporting frame used in these illustrations, a frame can be made of inch square pine slats, say, $5\frac{1}{2}$ ft. tall, and separated about 4 ft. by a cross slat at the top, and this frame held out parallel to the window by two thin slats loosely screwed at their ends to the sides of the window casing. A better plan, however, is to have a blacksmith or a wire screen company make a frame like that

shown in these illustrations, namely, of $\frac{5}{16}$ in. iron rods, taking about 15 ft. for a 4 foot wide window frame. The side arms, of same sized wire, to be, say, 2 in. longer than the bed is wide. These are hinged on the uprights near their curved tops and flattened for the reception of a screw when fastened to the outside jamb of the window casing.

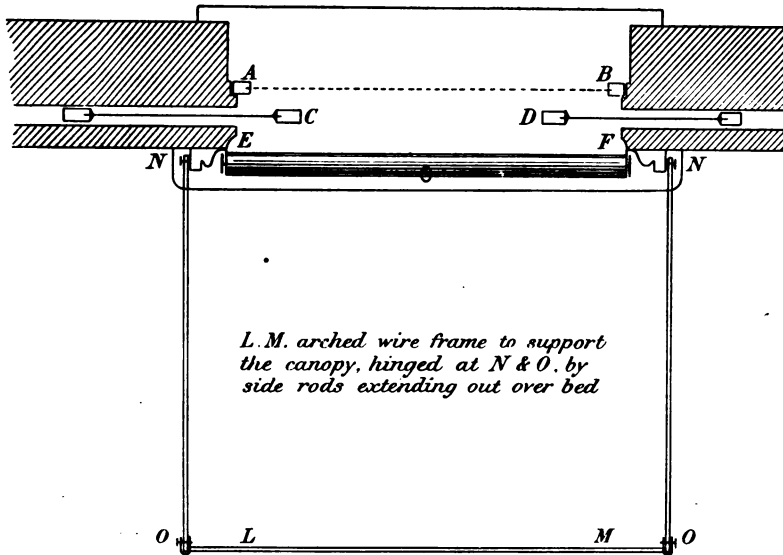


Wire frame, hinged at *X X*, and perforated for screws at *Y Y*.

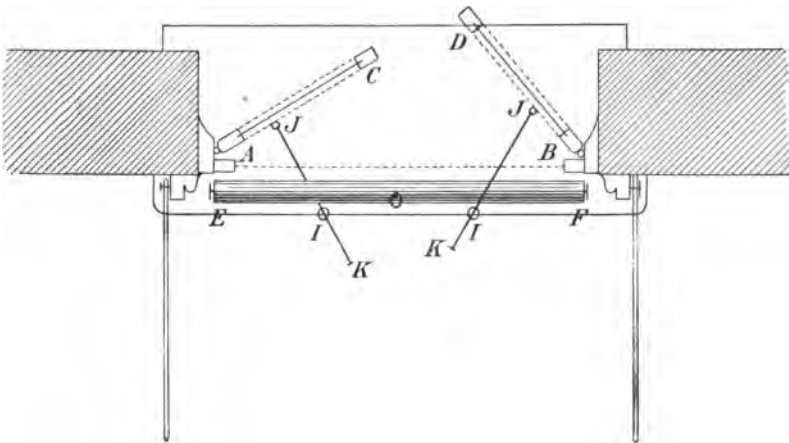
This form of awning is not expensive. It can be made for from six to twelve dollars, according to the size and the material used. It is recommended because of its simplicity and its adjustability to the varying house and weather conditions which obtain in every invalid's home. It may find a place among the many other substitutes proposed for outdoor sleeping tents, and especially the "window tent" of Dr. S. A. Knopf, described with others in his excellent paper read before the National Association for the "Study and Prévention of Tuberculosis," at Washington, in May, 1905.

In closing, I wish to suggest what appears to me an ideal arrangement for such a sleeping canopy as this; the same to be incorporated into the building plan of a house. The plan is suggested with the belief that something of the kind ought to be quite generally used in hospitals, dormitories, tenements and homes, since this principle of spending all the sleeping hours practically in the open air, probably affords the best adaptable means of preventing, not to say the cure of, tuberculosis. The architect's plan should either represent his own intelligent forethought, or the owner's demand for adequate

ventilating possibilities ; then such complete ventilation as is here sought, can always be easily and cheaply provided. It will not be very much more expensive to substitute this pos-



SUGGESTED CROSS-SECTION PLANS (looking down on window-sill) of improvements in window openings built with this method of ventilation in view. *A B*, screen outside of window (as above), inside (see below) ; *C D*, window sash sliding on rollers into wall, in lower cut hinged to open outward ; *E F*, window shade unrolling from below ; *J K*, sliding rods through pivoted stops *I I* to hold windows in place.



sible wide open window method, shown in the bird's eye view diagram, for the ordinary sash plan everywhere in vogue.

**BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL
SOCIETY.**

AN ordinary meeting of the Society was held at 20, Hanover Square, London, W., on Wednesday, January 29, 1908, Dr. STREET (Westgate) (Vice-President) in the chair.

Dr. ERNEST MACKAY (Hastings) read the Minutes, which were duly confirmed.

Among the visitors were Dr. Bergouignan (of Evian) and Mr. Lockhart Mummery (London).

Notes and News.

HASTINGS AND ST. LEONARDS.

METEOROLOGICAL OBSERVATIONS DURING FEBRUARY AND MARCH.

February.—Mean temperature, 41.5° —being 1.4° above the average; sunshine, 88.5 hours, 7 above the average; maximum record for one day, 8.3 hours. There were five sunless days. Rainfall, 1.12 in. Mean humidity, 89.

March.—Sunshine, 92.5 hours, with three sunless days; rainfall, 2.03 in. The day and night temperatures in March have been very equable, the greatest difference being only 9° , and the average about 6° .

Although there have been very few frosts, on the whole the spring promises to be a rather late one. Socially, there have been a good number of visitors, and it has been a better season than that of last year. Doubtless large numbers were attracted by the winter orchestra which has had a very successful run, with crowded audiences.

The town authorities are very wise in determining to repeat the experiment next winter, and it has been decided to begin it in November, thus reviving the autumn season from which in former years the town used to derive so much benefit.

The other places of amusement have provided very attractive programmes and have been well patronised.

BACTERIAL VACCINES.

MESSRS. PARKE, DAVIS AND CO. have been appointed sole agents for the sale of the bacterial vaccines now being produced in the Inoculation Department, St. Mary's Hospital, under the direction of Sir A. E. Wright.

These bacterial vaccines consist of bacterial cultures which have been sterilised at a temperature of 60° C., and which have been diluted with a $\frac{1}{4}$ per cent. solution of lysol. They are standardised in such a manner as to contain in each cc. a specified number of microbes, or, in the case of the tubercle vaccine, a specified weight of the powder put up in glass

bulbs, which, in each case, contain a little more than 1 cc. of vaccine.

THE Ninth National Congress of Hydrology and Climatology was held at San Remo, April 12 to 15, under the presidency of Dr. U. Martemucci. The Prefect of the Province took part in the reception, and the practical sympathy of the Minister of State was evidenced by the presence of one of Italy's greatest Ironclads in the Roads, whose officers took part in the proceedings. Fellows of the Society were present from most of the great towns and Medical Schools of Italy.

Dr. Frederic Bagshawe, of Hastings, Chairman of Council of the British Balneological and Climatological Society, was present as delegate of the Society.

The following is a brief account of the meeting :—

Professor Maragliano, of Genoa, gave an address on "Sanatoria for the Tuberculous in Relation to Public Health," and gave the reasons why they are not used along the Riviera. Very numerous papers followed, both morning and afternoon.

On Tuesday, 14th, the morning sitting was opened by a paper by Professor Vinal, on the treatment of hypertension. Other papers and discussions followed, both morning and afternoon.

On the afternoon of the opening day, the 12th, a garden party and excursion took place at the golf links at Taggia, some three miles distant, which was largely attended.

On the 14th took place the Banquet of the Association, which was attended by some 125 members, when many eloquent speeches were made.

On Wednesday, 15th, a very enjoyable excursion took place to Bordighera, where a sumptuous luncheon was given by the hotel-keepers at the Grand Hotel Angst, to some 120 guests, followed by a drive on the hills, and a garden party by Mr. Berry at the Villa Monteverde, and afterwards a drive to Ospedaletti, a most sheltered bay between Bordighera and San Remo.

A trip by steamer was arranged to Monte Carlo for the 16th. The whole of the proceedings passed off with great *éclat*.

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BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL
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SEASIDE TREATMENT FOR SICK CHILDREN.

By GEORGE CARPENTER, M.D.

*Chairman of Council of the Society for the Study of Disease in Children;
Membre Correspondant de la Société de Pédiatrie de Paris; Physician
to the Queen's Hospital for Children.*

THOSE of us who practise chiefly among infants and children realize that seaside treatment is not merely a luxury to be indulged in by the rich, but is daily becoming more and more a necessity for the successful treatment of the sick children of all stations in life. Not only is sea air invigorating for convalescing sick children, but it is equally advantageous to the delicate child, and it ought not to be wholly dispensed with in the case of the child who to a casual glance seems healthy enough. To those among us whose fate it is to practise in London or other great cities of the kingdom, the fact is daily and hourly thrust upon us that there is something lacking in the atmosphere of these places for the proper growth of a sturdy juvenile population, as well as for that of the speedy convalescence of the sick children in our hospitals and among our private patients.

Glancing at the children of the well-to-do dwelling in what

are deemed to be the most healthy parts of the metropolis, there are very few of them who pass twelve consecutive months in London, or other populous centres, without showing unmistakable signs of their environment in the way of diminished vitality. What is lacking in these enormous hives of human beings is plenty of fresh air and plenty of sunlight. True, the Londoner has his parks and numerous open spaces, and the general death-rate is comparatively low, but for all that the air here is more or less stale, and the sun has not quite the same life-giving properties that it possesses in other less crowded areas.

There can be no doubt about it that the effect of exposure to sunlight on animal life is tremendously invigorating. Combine plenty of sunshine with the inhalation of salt-impregnated, ozone-laden winds, straight from the ocean and redolent of the odour of the sea, and we are possessed of a tonic which hardly ever fails us, and which is second to none in our therapeutic armoury. The seaside is no less tonic to vegetable than to animal life, for the effect of sea air upon vegetable growth is remarkable. "It improves the cropping capacity of green stuff, and it acts like magic upon flowering plants and fruit trees" (*Gardening World*).

At the seaside the air is under greater pressure, there is more oxygen in it, it is cooler in summer and warmer in the winter than inland stations, and the range of the barometer and the thermometer is reduced to a minimum. The seaside, therefore, provides for the invalid and growing child all that is so manifestly wanting in the habitations of the town dweller.

It is often asked, What diseased conditions are benefited by residence at the seaside? And what, if any, are acted upon unfavourably? The answer to these questions is that there are very few ailments indeed to which the sick child is subject that are not capable of benefit by seaside treatment. To those recovering from surgical operations, and to those convalescent from infectious diseases, the sea is an infallible pick-me-up. Even severe cases of whooping-cough display less constitutional disturbance at the seaside than elsewhere, and the bronchitis which is so apt to be a sequela of pertussis is

benefited more by a short spell at the sea than by all the usual drug treatment.

As a remedy for tuberculous disorders there is none better. Children suffering from Pott's disease, from tuberculous arthritis and tuberculous adenitis, improve in appetite, gain flesh and colour, and show by their increased vitality that fresh, pure, seaside air is a very potent remedy. I look upon sea air as a sovereign remedy in tuberculous abdominal disorders, especially if the complaint be detected early, and if the child can avail itself to the full of the fresh air and exercise which the sea-coast affords.

Early cases of phthisis are also very responsive to sea air. Not only can sea air be relied upon to cure most cases of ordinary anæmia and debility, and promote the appetite, but it is also a valuable hypnotic. The restless and sleepless child of the town usually soon becomes somnolent and ready for its afternoon siesta when at the sea,

The child well-nigh moribund from entero-colitis can almost certainly be relied upon to recover at the sea, and if cases of summer diarrhoea could be rapidly transported to the seaside the mortality-rate therefrom would show a sensible reduction.

Asthmatic children frequently derive benefit at the seaside, though there are places on the coast-line where the reverse is the case. Those children who have asthma in association with bronchitis often derive permanent benefit from residence at the seaside. The sea is often no less beneficial to those who develop asthmatic attacks in association with chronic bowel troubles. The sea here acts in a twofold way; the *primæ viæ* are strengthened, and the nervous system gains in strength and stability step by step with the increase in bodily health.

In young children the one thing to be fought against is the formation of the asthmatic habit. Any treatment that improves the physical health will at the same time strengthen the nervous system and render it less irritably responsive to reflex and direct excitation.

For the treatment of winter colds and coughs, to which

some delicate children are so prone, there is nothing so beneficial as residence at the seaside. Children who have been operated upon for adenoids, those who possess a spongy condition of the naso-pharynx, those who are prone to sore throats and have some hypertrophy of the tonsils, those who are subject to Eustachian catarrh, and those who frequently develop attacks of laryngitis, often associated with spasm of the glottis, should be sent to the sea; the town is no place for them.

Rickets is a complaint which derives great benefit from seaside treatment, and the frequent associates of rickets—bronchitis and laryngismus stridulus—become increasingly less troublesome under doses of sea air. Children convalescing from chorea, and those suffering from rheumatoid arthritis, do well at the sea, and cases of infantile paralysis are also greatly benefited by a prolonged stay at the sea-shore. But cases of eczema and inflammatory eye complaints do not do well and should not be sent there.

There are, therefore, a large number of disorders occurring in children for which sea air, if not actually curative, is certainly very helpful. For us Londoners, having decided upon a course of sea air for our patients, there are numerous seaside resorts within a hundred miles or so of the metropolis from which to make a selection. On the north of the Thames we have seaside towns in three counties from which to make our choice, viz., Essex, Suffolk, and Norfolk.

In Essex there are Clacton, Frinton, Walton and Dovercourt; in Suffolk, Felixstowe, Aldeburgh, Southwold and Lowestoft; in Norfolk, Yarmouth, Happisburgh, Cromer, with its adjacent villages of Overstrand, Sidestrand, Trimingham and Mundesley; and Wells and Hunstanton.

Speaking generally, it may be said that the climate in these places is bracing; there is an abundance of sunlight, and fogs are not prevalent. In the winter and spring this coast is bleak and cold, and the east winds are very searching. It is admirably adapted for the treatment of tuberculous affections and incipient phthisis, but those who are subject to chest complaints will not find it suitable in the winter and spring,

and cases of nephritis should not be sent there. Rheumatic patients are benefited during the summer and autumn months by residence at Clacton ; on the other hand, Dovercourt, Aldeburgh, Southwold, and Cromer appear to be bad for rheumatism at all times. Hunstanton, unlike the other watering-places, faces due west, and, although bracing, is protected from the north, and to a less extent from the east. In the spring the east winds are much less severe in this town than at the places mentioned.

The Kent coast, on the south of the Thames, gives a choice of several seaside places ; thus Whitstable, with its suburb Tankerton, Herne Bay and Birchington, Westgate and Margate, are all within easy distance of London. Following the coast-line on the Island of Thanet the more important towns are those of Broadstairs and Ramsgate. Whitstable and Herne Bay are situated on a clay soil, are much exposed to cold north-easterly winds in the winter and spring months, and are not suited to the treatment of phthisis.

In Whitstable proper, phthisis is not uncommon, but cases do well when removed to the higher ground of Tankerton and to the rising ground beyond, between it and Canterbury. Herne Bay is not suitable for these cases. The climate of Birchington, Westgate, and Margate is decidedly stimulating, and cases of tuberculous disease and incipient phthisis do well there.

Where a perhaps somewhat less bracing atmosphere combined with a protection from cold winds and a southerly aspect are desirable, the choice will fall upon Ramsgate. Both Ramsgate and Broadstairs possess admirable winter climates for most invalid children. But, owing to the prevalence of east winds in the spring-time, the seaside resorts of Thanet are not well adapted to the treatment of chronic bronchitis and advanced phthisis.

On the south coast there are a number of seaside resorts to choose from. Those with a bracing atmosphere are Dover, Folkestone, Eastbourne and Brighton. Hastings, St. Leonards, Worthing, Littlehampton, and Bognor are favoured with a mild climate. The former are more suitable to cases of tuber-

culous complaints and to early phthisis, and the latter to those recovering from acute bronchitis, to those subject to chronic bronchitis, and to convalescents from acute renal disease and rheumatic fever and heart disease. Asthmatic cases are often benefited by residence in any one of these towns.

The Isle of Wight, as a health resort for children, possesses a variety of climates. If a moderately bracing climate is required, then Sandown and Shanklin, on the east coast, should be selected. Sandown is open to both the sea and the land, and here there are no sheltering houses or cliffs to protect it from the south-westerly winds, which are often very high. Shanklin is situated partly on cliff and partly on the shore, with protecting Downs to the south. Both are suitable to the treatment of tuberculous disorders and incipient phthisis; but in the spring the east winds are searching.

Ventnor, with its southern aspect, its dry and well-drained soil, and complete shelter from northerly and north-easterly winds, is more suited to the treatment of patients with disease of the lungs and those recovering from nephritis. Cases of asthma can obtain a variety of climates at the different terrace elevations; but, owing to their steepness, cases of heart disease with imperfect compensation should not be sent there.

In the short time allotted to a paper such as this, there must of necessity be a number of glaring omissions, and I am conscious that there are many other important seaside resorts which I have not had time to mention, and there are many to which I have done but scant justice. As a Londoner I have given my experience of the health resorts that I have named in the treatment of children's complaints. Unfortunately, we London practitioners are left very much to our own devices to find out, by bitter or other experience, the localities which are best suited to the cure of the disease.

It appears to me that a Society such as this should be the means of educating the London practitioner on the subject of British seaside health resorts. In the course of a lifetime we are enabled to glean a good deal of useful information on this subject, but, after all, the man on the spot should know

more of the therapeutic virtues of his own town than the outsider. I think if the seaside doctors would pay more attention to the study of children's complaints and to the therapeutic virtues of the sea water, which they possess in such abundance and so close at hand, in relation thereto, they would confer a distinct boon on future generations.

Up to the present I have purposely avoided drawing attention to the therapeutic advantages of sea bathing. Unfortunately, sea bathing at our seaside places can only be indulged in under ordinary conditions for a very short period during the year. The usual precautions which are to be adopted in relation to the time of the bath and to its duration are well recognized, and I will not dwell upon that subject. That sea bathing is tonic and invigorating to those who are blessed with good reaction there can be no question. But sea bathing should not be dependent upon our climatic vagaries; it should be made possible for children to indulge in it all the year round.

In order that a bath may exercise its tonic properties, it must be applied at a temperature that is either colder or hotter than that of the body. While hot or cold baths increase the metabolism, tepid baths produce no such effect. The metabolism is further increased by mechanical stimulation, such as rubbing, and by the addition of chemical substances to the water such as CO_2 . In sea water the chemical stimulant is the various salts held in solution, and which are thence deposited in the pores of the skin. In general, it may be stated that cold baths produce greater metabolic effects because they lead to more muscular movements. The study of the effects of hot and cold sea-water baths and douches on the secretions of children is a subject, I think, which would be productive of very useful information to the medical practitioner.

The influence of hot and cold water on the renal and cutaneous circulation is, of course, well known to all of us—it is a daily occurrence. But it is not generally recognized that after a cold bath temporary albuminuria is apt to occur in those adolescents suffering from cyclical albuminuria, and

that paroxysmal hæmoglobinuria is apt to arise in those subject to it after both cold and hot baths ; or that in kidney disease the urea is capable of being secreted in increased quantities by the skin ; or that albumin has been found in traces in the sweat in many cases of nephritis. But little is known on the effect of baths upon the intestinal secretion. Kowalski states that hot baths increase the secretion of bile, while cold douches bring about only a transient increase. Hot packs appear always to induce an increased flow of hydrochloric acid in the gastric secretion, while cold baths are said to delay its appearance.

Thus it appears that baths not only have some influence over the metabolism, but they are capable of altering the secretions. Topical applications of hot and cold water affect the underlying tissues either directly, or they bring about tissue changes in sequence to the resulting hyperæmia and anæmia. In cold applications we possess greater powers of penetration, but with an increased blood supply these powers are diminished and hot applications are therefore less searching. Heat accelerates metabolism, as shown by Penzo, who treated the ears of a young rabbit to different temperatures and found that warmth hastened their growth. And heat, by reason of the hyperæmia it produces, promotes absorption, while cold retards it.

It has also been proved experimentally by Klapp that hot applications produce hyperæmia of the visceral and parietal peritoneum, so that the possibility of directly influencing the abdominal viscera in this manner should not be lost sight of. Not only does hyperæmia produce the absorption of fluids, but it tends to resolve the more solid exudates. Thus it would appear that by altering the blood-stream by applications of hot and cold water we are enabled to exert a considerable influence on local metabolism. Seeing that hot and cold applications produce very obvious results, it always strikes me that the physician practising at the seaside does not make the best use of one of his material advantages—the sea-water. How few are the seaside resorts that make even a pretence of treating their cases by topical and general applications of sea-

water ! The seaside—and this more particularly applies to some of our south coast watering-places—should not be looked upon as a suitable place at which town children can spend a few weeks in the summer, but should be viewed as suitable localities for an all-the-year-round residence for sick children, where their ailments can receive special attention.

The present custom is for the family doctor to send the sick child to the seaside to recuperate as best it may, and the seaside physician never sees the patient unless it unfortunately happens to develop some acute ailment requiring the attention of a medical man. I do not think this is a satisfactory arrangement, and it is one that should be remedied. But before this can happen the seaside physician must make it his business to teach his town brother something about the climate in which he resides, and what children's ailments can be suitably treated there. I think he might also with advantage imitate the methods of those practising in the various British and foreign seaside resorts, for example, Biarritz and Sidmouth, and British and Continental spas, where the value of local water treatment is recognized and the treatment is abundantly employed.

These then, gentlemen, are my suggestions, and I leave it to you to decide whether such a scheme is practical or not. But I hope that before many years have passed by there will be found a little band, specialists for children, well versed in bath practice at our seaside resorts.

Dr. BAGSHAWE, J. P. (Hastings), said the Society was very much indebted to Dr. Carpenter for his paper on seaside resorts and the treatment of children thereby. Perhaps at Hastings there was as large a collection of sanatoria, especially for children, as would be found anywhere. There were large homes for London children, for Hertfordshire children, and for local children, and thus Hastings was able to provide accommodation for large numbers of children from among the poor. Hastings was largely frequented by the public during the winter months, and that town might be said to be admirably suited to childhood. Whereas many delicate children were not fitted to stand the cold winter air of bracing

seaside resorts on the East Coast, which had been so well discoursed on by Dr. Carpenter, Hastings was able to afford considerable advantage to the more serious and sensitive forms of weakness and disease. The author contended that many children would be found to benefit who were the subjects of such affections as bronchitis and asthma ; indeed, asthmatics did extremely well at Hastings. A colleague of his, who was appealed to, asked him (Dr. Bagshawe) what complaints he considered Hastings most suitable for. His long experience enabled him to say, in reply, tuberculosis, chronic heart disease, and old chronic nephritis. Places like Hastings and Folkestone had more than one climate. There was one climate on the sea front, protected by the hills to the north of the town, and another at the back, where any altitude up to 500 feet could be had, and a bracing atmosphere. Dr. Carpenter had alluded to the far greater equability of the climate at the seaside in summer and winter than was experienced inland. Though Hastings was said to be hot and relaxing in the summer, he had found it to be 8° to 10° cooler than London and places inland, and that was a comparison which usually held true. He had been glad to hear the reference to treatment by salt water, for that was a most important adjunct to the climate. He had no hesitation in advising the regulated use of the salt-water bath, in the house of the patient and in the baths. At Hastings there was probably the largest tepid salt-water swimming bath in the kingdom, where patients who were sufficiently vigorous could have salt-water bathing at the same time as such muscular exercises as suited their case. The metabolism in a child was well known to be carried on more actively than in an adult, and thus in children sufficient metabolism was carried on in such a climate as that of Hastings when they might not be able to stand the more bracing East Coast.

Dr. STREET (Westgate-on-Sea) said he wished medical practitioners, whether they lived at the seaside or in London, would live for a short time, if possible, on the East Coast. He was always hearing things about the East Coast which

he did not experience. He had lived on that coast for more than twenty years, and it had been his fortune, or misfortune, to spend the preceding spring in the metropolis, and never had he experienced such a wicked, withering wind, as he did that spring in London. He believed the East Coast was judged by what people thought it must be, rather than by what they knew it was. He did not think any place in England was exempt from east winds at times, and had bitter and disagreeable ones, and he could not admit that they were any worse on the East Coast than elsewhere. On the other hand, he believed that, as it contained more moisture, an east wind was more bearable there than inland. Dr. Carpenter had passed some strictures on seaside practitioners, rather indicating that they had not told the profession quite what they thought their particular resorts were good for. He could not plead guilty to that indictment. In his humble way, he (Dr. Street) had tried to show what his particular corner of England was good for. With regard to sea bathing, he was aware that a large number of children were sent down to the seaside with questionable instructions that they were to be washed and bathed in sea water. But many children were rather upset than otherwise by that sea bathing; the fact was brought before him every summer. He had to do with schools and a large number of children, and schoolmasters did not exactly look forward to the sea-bathing season. He thought the doctor benefited more from it than did the pupils in many instances. Boys of 10 to 12 years of age could constantly be seen to flag as the result of sea bathing, though it was well-regulated sea bathing, taking place at a reasonable hour and lasting a reasonable time. The fact was noticed not only in those who came to school at the seaside. He would send a child to the seaside for the benefit of the sea air, rather than for the sea water; and he would do so without any particular ideas as to the percentage of ozone in sea air.

Dr. LEONARD WILLIAMS said there did not seem to be anybody present who came from the South-Western district. As he formerly lived in that district he might complain, if

he felt in a complaining mood, that Dr. Carpenter's paper took no cognizance of the special climatic features which that district offered. To talk of seaside climates without making a distinction between the various kinds of such climates—between that of Margate, for example, and that of Torquay—was mere verbiage. There was a great variety of climates, which had diverse effects upon different people. The equable, moist, humid, relaxing climate of the South-Western district had very notable effects in the case of children, but they were very different effects from those to be expected from such places as Margate and Folkestone. From the experience which he had had in London he would say that glandular troubles in children were much more benefited by bracing seaside climates than by relaxing ones; the latter certainly did not seem to prevent such troubles occurring. But for the permanent residence of children and old people, especially for old people who had definite decrescent troubles, such as kidney disease and arterial sclerosis, the moist, relaxing climate of the South-West was infinitely better than the bracing East Coast climate. Dr. Carpenter had complained that the seaside practitioner had done nothing to teach his London brother. He (Dr. Williams) would put the boot on the other foot. To his own knowledge, the seaside practitioner had been trying for the last ten or twelve years to teach the London practitioner, but the London practitioner refused to learn; he thought he knew more than the seaside practitioner could tell him, and declined to place himself *au courant* with the very useful information with which the latter was in the habit of supplying him. If the mere Londoner would be more diligent in reading his BALNEOLOGICAL JOURNAL it would be a good thing for the general standard of knowledge in these matters. That the London practitioner had taken no notice of the teaching therein contained various seaside practitioners could very readily show. He was entirely at one with Dr. Carpenter in his complaint that seaside places of this country did nothing to use sea water as a natural mineral water, in the same sense that spas used their natural mineral waters in this country. The only

English place which he knew of where sea water was used in the form of baths and douches was at Sidmouth, in Devonshire. But the case was different at French seaside places ; there the sea water was used in a much more scientific way than it was in this country. At Biarritz, where there was natural salt water similar to that at Droitwich, the water was used in the same way as at Aix-les-Bains and Vichy ; and certain stations made a special point of attracting children for that kind of treatment. Commencing tuberculosis, and glandular disease in children, and rickets, did far better at such places than they did by mere residence at the seaside. To prescribe open sea bathing for all and sundry, merely because people were at the seaside, was to lose all sense of perspective. Sea water was an exceedingly good thing, but in order to produce good effects it had to be used in dosage, temperature, and amount, just as carefully as any other powerful therapeutic agent.

Dr. GURNEY (Eastbourne) said all must feel much indebted to Dr. Carpenter for his very valuable paper on seaside resorts ; and, as a practitioner at Eastbourne, he wondered whether Dr. Carpenter had ever practised at a sea-coast town. The author named so many complaints as being benefited by the sea coast, and rightly so, that one wondered why all the patients did not go there. Eastbourne was not so humid as Hastings ; it had a mildly bracing climate, but not as bracing as Margate and Ramsgate. Speaking from his own experience, when one had a patient coming with trouble of any sort, some tuberculous affection was the first thing the practitioner thought of and tried to exclude. That was so at Blackburn, where he formerly resided. But in Eastbourne that was one of the last things thought of, the reason being that there was, comparatively, so little of it in the town, most of the few cases there were coming from other parts. That showed how good was the climate for tuberculous affections. Eastbourne was not the best place for the later stages of phthisis. But when patients so afflicted were for any reason unable to leave the town, he recommended them to go to the back of the town, where the air was softer. In the later stages of whooping-

cough, when the cough remained and the whoop was practically over, Eastbourne was a splendid place for clearing off the convulsive cough which was left. A good many cases in these later stages of whooping-cough came from other parts, and the patients with it always did well. Dr. Carpenter had said the seaside was a bad place for eye affections, and perhaps many would agree with that ; the glare and the salt of the air probably irritated the condition. He knew a bad case of scleritis get well at Eastbourne, however, but the patient avoided the sea front and kept to the shady walks, which are such a feature in Eastbourne, and probably the change of air, by improving the general health, aided the recovery. He agreed with what Dr. Carpenter had said about the application of sea water, and if seaside practitioners could develop a more methodical way of treating the complaints sent to them it would be very much better for the patients who were sent.

Dr. ACKERLEY (Llandrindod Wells) said that although he did not practise at a seaside town, he had spent thirty months in the last twenty years at the seaside with children, and for years past he had sent children with certain conditions to the seaside. Dr. Carpenter had commented on London children being pale and anæmic, and showing a tendency to have glandular troubles, and their improvement at the seaside ; but he (Dr. Ackerley) wondered how much of that improvement depended on the seaside, and how much on the children getting out into the open air when there. In other words, how much more beneficial was the seaside than any other country place ? Did not those troubles frequently occur among those regularly residing at the seaside ? He referred particularly to the West and South Coasts, as he had not much knowledge of the East Coast. The great point was getting out into the open air and sunshine. During the last winter he spent some months in a little village, at Mount's Bay, Porthleven. There a cook came to them, who was pale and weak, and very much like a town girl. But she had had good food. It was the practice at the house she left to have the windows always closed. Within a month, in a house where windows

were wide open night and day, she became a strong, robust, ruddy girl, and had remained so ever since. Children at the seaside were allowed more freedom, and went out in weather which would be thought harmful at home. He would have liked to hear Dr. Carpenter do what Dr. Leonard Williams had done—namely, differentiate between the seaside places. Even Dr. Williams classed them rather grossly: he contrasted the East Coast with the damp, humid, equable climate of the West Coast. His (Dr. Ackerley's) experience of the English coast was largely of Devon and Cornwall. Although the North Cornish coast might be more moist than the East Coast, it was quite as bracing, yet the mean range of temperature was less, so that it was better for certain patients. There was as much difference between the temperature of Penzance and Newquay as between Newquay and Southwold or Cromer. And on the North Cornish coast there were many more days in spring and winter when children could be sent out than on the East Coast. He agreed that east winds were almost as severe in the South West of England as on the East Coast, and probably it was less pleasant in the West because the winds passed over many miles of dry land, and were not improved in the transit. In swimming baths at the seaside there was not enough attempt to imitate waves. Sea bathing was not merely getting into the water, but there was also the movement of the water. He had been much more invigorated by the surf bathing on the North Cornish coast than by bathing in smooth water at Falmouth and other sheltered places, and it would be useful to imitate that movement in indoor baths. During the bad weather in the early summer last year his children were on the North Cornish coast, the sun being not much seen. They became fat and very bronzed. In July, when there was a good deal of sun, they came to an inland place, yet they lost their brown colour, and lost weight, but they were quite as well. He had previously noticed that when children came from the sea they rapidly lost their bronzing, and wondered how far that implied the presence at the sea coast of those actinic rays which were so useful in tubercular and glandular conditions.

Dr. STYLE (Moreton-in-Marsh) said that although he now lived in an inland place which bore a rather disagreeable name, for some months, years ago, he was at the Margate Infirmary. He then recognized forcibly the advantages to children of seaside air. In the case of delicate children with adenoids, or those who showed a tendency to be tubercular, he always tried to procure for them continual residence at the seaside. That was much more important than a stay of only two or three weeks in a year. No doubt it was often an advantage for children to have sea bathing, but it must be regulated with great care. He never recommended it as a matter of course, but that the local medical man should be consulted and the result of his experience obtained. In many cases children going to the seaside from towns and indulging in sea bathing seemed to derive from it positive harm. It would be a great gain if the larger seaside towns would make the bathing in the winter months more attractive than at present. Often such baths were damp and very unattractive, and if they could be made like a bathing cove with a deep end and a shallow end, where children could run about and play, and also have warm air, it would be a great improvement.

The PRESIDENT said that, as a resident at one of the seaside resorts, there was much in what Dr. Carpenter said with which he was in agreement. In the beginning he thought the author was going to send everybody to the seaside, because, apparently, he thought every disease was cured by residence there. Such an idea he would have disagreed with. But the generality of people thought a great deal of residence at the seaside, and that was shown by so many schools having been established at the seaside. He thought there was no scientific reason for sending children either to the seaside or to inland resorts, but his experience was that they did well at the seaside. He was in agreement with the author's opinion that people who required bracing should go to the East and South Coast, whereas those who needed soothing treatment did better in the West of England. But he had never been able to see why people should go to Margate and not to Ramsgate, or to Ramsgate and not to Folkestone. Margate had a very

strong reputation for the treatment of glandular affections. He had made comparisons between children with glandular affections who had been to his own town—Folkestone—and those who had been to Margate, but he had never been able to make out, scientifically or clinically, why Margate occupied its high position as compared with some other places. The public gave it a pre-eminence, and he was not prepared to say it was misplaced. There were many diseases which did not do well at the seaside. He would be loth to send children with anæmia to a strong seaside resort, *i.e.*, where the climate was bracing. Many patients at the seaside seemed unable to sleep; some of the worst cases of sleeplessness he had seen occurred at seaside places. Rheumatism in any form did not do well there. The cases which benefited by the seaside were those which required astringent treatment, such as leucorrhœa, nasal affections, and congestive conditions of the throat and ear. Dermatologists seemed never to send skin cases to the seaside, and yet among all the out-patients he saw at Folkestone there were very few cases of skin disease; it was universally admitted, however, that skin cases do badly at the seaside. With regard to eye cases, the only point against them was possibly the glare; he did not think there was anything against them in the sea air. There should be a great distinction made between the application of sea water and sea bathing. Sea bathing never suited him, and he had found many children with whom it did not agree. His answer to the paper would be that the seaside physician was quite willing to treat cases scientifically as far as he could, but the patients were not sent to him. They went to the seaside either on their own initiative, or with instructions from their own doctor, who, in some cases, knew practically nothing about the matter. He agreed that many people who came for sea bathing actually did badly as a result. For many years he had used sea water for gargles and injections, and he thought there was room for extension of the practice. As Dr. Bagshawe had mentioned, the cases which did best at the seaside were tuberculous ones. At Folkestone he had seen more good result from the early treatment of tuberculous

cases than any other condition he could name. The next best results were in those who were convalescing from acute diseases, such as typhoid, influenza, and various lung conditions, especially when combined with good food and proper ventilation. They would join in thanking Dr. Carpenter for having brought the subject forward. He would ask Dr. Carpenter to somewhat modify his criticism of the seaside physician, who took every means to use the materials at hand for the benefit of patients, if only those patients were sent to him.

Dr. CARPENTER, in reply, thanked members of the Society for the kind attention they had given to his paper. He did not mean to pass any strictures; he had come to learn, hoping to hear from those who practised at the sea, some valuable facts about the seaside at which they resided. For his sins he had to live in London, and it was impossible for the Londoner to know everything about all the seaside towns of our coast-line. The places which he mentioned in the paper he had visited. He had been to nearly all the important seaside resorts in England, but that was very little better than just visiting them in a train. To know them one must live in them; and thus one depended on what one's brother practitioners could impart. The Chairman said he (Dr. Carpenter) had discussed all the children's diseases, but there was scarcely a disease which he had alluded to in the paper which various speakers had not themselves spoken of. He was sorry he could not deal fully with the South-West of England, but when he arrived at the Isle of Wight he began to feel weary, and so begged Dr. Leonard Williams to forgive his omission. With regard to the effect of sea bathing, he desired to ask Dr. Street, and others of experience in such matters, whether the effect was physical or mental. When he was a very small boy and unable to swim he was thrown bodily into a swimming bath, and the mental shock which he then experienced was of a demoralizing nature. There were many small children who were dealt with in a similarly crude way, and he thought such a practice reprehensible. Over-bathing was certainly bad, and if children had not a good reaction, sea

bathing should not be administered. What he had most in mind was the local application of sea water in the form of douches, sprays, and so on, a form of treatment which was carried out largely abroad, but much neglected in England. If practitioners in London and the country were to pull together, he believed they might teach each other a great deal. It was true that some part of his paper was debatable, but it had achieved an object, for it had produced a discussion, which was the purpose for which it was written.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL
SOCIETY.

GEOLOGY OF HARROGATE IN RELATION TO ITS
MINERAL WATERS.

By C. FOX STRANGWAYS, F.G.S.

I PROPOSE to lay before you a short sketch of the geological structure of the Harrogate district, and to point out how far the peculiarities of the mineral waters are due to this cause. The strata which are exposed at Harrogate are a portion of the Carboniferous System, which for convenience are divided into three separate groups—carboniferous limestone, limestone.shales, and millstone grit. These consist of a series of alternating beds of sandstone, shale, limestone, or chert, some of which have very distinctive characters which they retain throughout large areas. In the immediate vicinity of Harrogate only a portion of these rocks come to the surface, and it is with these only that I propose to deal at the present time.

These are the upper portion of the limestone shales and the lower part of the millstone grit. The former of these at Harrogate consists in the upper part of dark blue shales, which are succeeded by thin bands of earthy limestone and chert full of the remains of encrinites. This cherty limestone is the so-called roadstone of Harrogate; its exact position in the geological scale is somewhat doubtful, but it probably represents some of the thin limestone bands that occur in the lower part of this series where they crop out to the west. It is a hard siliceous rock with a conchoidal and hackly fracture, but it is very frequently much decomposed, having all the calcareous matter dissolved out, when it resembles pumice-stone in texture. It has been extensively quarried in the neighbourhood for mending roads. These cherty beds rest on dark blue shales containing sulphur, iron and other minerals; and below these, again, there is a thin

rubbly sandstone, also containing sulphur and iron, resting on other beds of shale, which are the lowest strata visible in the neighbourhood.

The precise equivalent of these measures to the west is rendered somewhat doubtful by the thinning out of one or more beds in the country to the west of Harrogate; for if we examine the country west of the millstone grit area where we should expect to find the same measures cropping up, we can discover no rocks which exactly correspond to those at Harrogate. The reason of this is either that these measures gradually become thinner until they finally disappear in their passage to the west, or else that they are so altered in their general composition as to be no longer recognizable as the same beds. When such changes as these take place in an isolated area like Harrogate it is extremely difficult to identify the beds, or to say exactly to what part of a formation they belong. In this case the only clue there is to their correlation with the strata of a known area is the lithological character of the rocks and their relative position in the series, and even this is not always to be depended upon. But we shall not be far wrong in considering these beds at Harrogate a portion of the great shale series which lies between the millstone grit and the carboniferous limestone, for it is evident that they lie between these two great formations.

The millstone grit of this district is, for the most part, a series of some half a dozen beds of coarse massive grits separated from each other by thick beds of shale. A very good section of these rocks is exposed along the railway cutting to the south of Harrogate, but the best idea of the nature of the grits themselves is obtained from Plumpton Rocks, Birk Craggs and Almes Cliff rocks. It is these rocks which, stretching over the moorlands to the west, form some of the grandest and wildest of the Yorkshire scenery.

The strata which occupy the district to the west of Harrogate and south of Settle are thrown into a series of nearly parallel antilinal and synclinal folds, ranging east-north-east or north-east, of which the most remarkable are

those in the neighbourhood of Bolland and Clitheroe, by which the carboniferous limestone and the beds of the shale series are frequently brought to the surface and extend in long lines across the country to Skipton and Appletreewick, from whence their direction is nearly east towards Harrogate and Ripon. Along these lines the higher and middle members of the millstone grit rocks are wanting, and the lowest beds of millstone grit crop out, enclosing elliptical patches of the shale series.

If it were not for these anticlines the millstone grit might be separated from the shales below by a nearly north and south line, ranging along the western side of Gréat Whernside, Rylstone Fell and Skipton ; then, in a general way, with the exception of some of the higher hills which are capped by millstone grit, the country lying west of this line would be composed of the shale series, while that to east would have the various members of the millstone grit ; as it is, this regularity is broken by the disturbances previously mentioned, so that the base-line of the grit retreats considerably further to the east in the neighbourhood of Greenhow and Skipton. It is with the southern of these two lines that we have chiefly to deal.

The anticline upon which Harrogate stands is a continuation of that at Skipton, although its direction in the neighbourhood of Harrogate is north-east and not nearly east, as this would lead us to infer. Its course across the moors from Bolton Abbey to Harrogate is well marked on the high ground about Beamsley Beacon, but from thence eastwards it is not so easily traceable till we get within a mile or two of Harrogate, when its general outline again becomes very distinct.

At Harrogate, the general geological structure is rendered very apparent by the massive grits at Pannal and Birk Crag, where the same bed of grit occurs striking in a north-east direction on either side of the anticline, and giving at a glance the key to the main geological features of the neighbourhood.

The axis of this disturbance is well shown in the town of

Low Harrogate, by the quarries which have been opened for roadstone on either side of Bogs Field, where the impure limestone of the shale series may be seen dipping north-west and south-east at high angles, on either side of this little valley; the same thing occurs again near Beckwith Shaw to the south-west of Harrogate. From these two positions the general run of the axis of disturbance may be easily gathered.

The exact base of the millstone grit is not so easily traceable in all cases, and can only be followed by very close inspection and consideration of the country. On the southern side of the anticline its general course is from the south of Pannal Ash across the Stray to High Harrogate; to the north of the town its outcrop being obscured by faults is not so well marked, the junction with the underlying shales ranging along a north-east line from near Shaw Green to the north of Harlow Hill and Low Harrogate. Between these two lines is an area of about three square miles occupied by the outcrop of the shale series, upon which the town of Low Harrogate is situated. The highest point of this area is Harlow Hill, 600 ft. above the sea, and it is here that the greatest amount of disturbance appears to have taken place. The sandstone which caps this hill is one of the lowest beds of the district, and underlies the roadstone of Harrogate and Beckwith Shaw, towards both of which places it has a considerable dip. About a mile on either side of this hill occur most of the principal sulphur springs of the neighbourhood, to the more particular discussion of which we will now turn, and glance at their chemical constitution.

On the present occasion I do not propose to treat this part of my subject in much detail. It is sufficient for our present purpose to state that analysis shows that the principal chemical constituents are such that they may conveniently be divided into four principal groups: The Strong Sulphur Water, the Mild Sulphur Water, the Saline Chalybeates, and the Pure Chalybeates, and this seems to be the best mode of classing them with reference to their sources.

The principal springs of the strong sulphur water are the Old Sulphur Well, one of the wells in the Montpellier Gardens,

and the Hospital Strong Sulphur Well. These are characterized by the large amount of chloride and sulphide of sodium they contain, as well as by the great bulk of their gaseous constituents, especially nitrogen, carburetted and sulphuretted hydrogen and carbonic acid. The mild sulphur, of which the principal are one of the springs in the Montpellier Gardens, one of those at the hospital, those at Harlow Carr and the one at Starbeck, resemble the strong sulphur water in their general constitution, but do not contain so large an amount of chlorides and sulphides, although they are slightly richer in alkaline carbonates.

The strong saline chalybeates, of which there are two, the Cheltenham Spring and the one in the Montpellier Gardens, are remarkable for the great quantities of the carbonic acid that they contain.

The pure chalybeates, the principal of which are the Tewit Well and John's Well, although there are several others, not only in and near Harrogate, but in almost every district, contain a far less proportion of salts than either of the above, and these are chiefly in the form of carbonates with scarcely any chlorides.

To recapitulate them, the Harrogate waters consist of four distinct classes, each of which has a certain marked peculiarity in its chemical constitution. Class I., the strong sulphur, is very rich in chlorides and sulphides, with a large bulk of free gases. Class II., the mild sulphur, has nearly the same constituents as Class I., but in a less concentrated condition, and is also slightly richer in carbonates. Class III., the saline chalybeate, is very rich in chlorides and carbonates, but contains no sulphides. Class IV., the pure chalybeate, contains a much smaller proportion of saline ingredients than either of the preceding; in fact, it more nearly resembles the ordinary kinds of drinking-water with a larger percentage of the carbonates of magnesia and iron.

Let us now see what connection these four classes of water bear to the geological structure of the neighbourhood.

All the writers on this subject agree in considering that the mineral waters of Harrogate are derived from the peculiar

geological structure of the neighbourhood, but they differ somewhat in their ideas as to their origin. Some, and they are rather a majority, consider that most, if not all, the Harrogate mineral waters have a common source, and that the difference in the springs, which are only partial, are occasioned by the different channels through which they reach the surface. Others, again, consider that each spring has its own independent source, and that it exerts no influence over any of the neighbouring springs as long as the water remains below the surface. Professor Phillips, in his description of the geology of this part of Yorkshire, considered that the chalybeate and sulphur springs of Harrogate originate from the junction of two lines of fault, one running nearly north-east and the other about due north. With regard to the first of these two lines of fault, it is very apparent that there is at least one if not several faults running in a more or less north-east direction, and parallel to the main axis of disturbance; but from the manner in which the Harrogate anticline is enclosed both on the north and south sides by great ridges of grit striking across the country in an unbroken line for some considerable distance on either side of Harrogate, I do not think it is possible that the strata can be broken by a north and south line without the dislocation being more apparent, and even supposing there were a cross dislocation, there is no reason that it should influence the mineral waters of Harrogate any more than at hundreds of other places where the same thing occurs. It seems much more probable that the real source of these springs is from the same, or nearly the same, beds as those from which they issue at Harrogate; that they are confined to this group of strata throughout their entire course, and that the faults and disturbances in the neighbourhood of Harrogate exert only a minor influence on the peculiarities of the waters. If we examine the geology of the country to the west of Harrogate we find that the strata, in a general way, consist of thick massive grits separated from one another by varying thicknesses of shale which are thrown into a series of slight undulations, but are not broken by any faults of consider-

able size. These beds, accordingly as they partake of the sandstone or shaly character, become pervious or impervious to the passage of water ; by this I mean that the grits and sandstones allow of the percolation of water through their substance in all directions, whereas the shales admit its passage only along the planes of lamination, and only then when they have become tolerably arenaceous. From this it follows that water which issues from a certain orifice, say the old sulphur well at Harrogate, would be confined throughout its entire course to the same strata, although probably not to exactly the same beds as those between which it springs at Harrogate unless the continuity of the shales were broken by large faults. Now, there are no very large faults in the country under consideration. Small faults I do not think would make any interruption in the passage of the water, as their effect would be rather to bend the shales than to cause any absolute disruption of them ; and even supposing the strata to be broken, this would not necessarily cause either a complete stoppage or more than a partial diversion to the passage of the water.

One great proof of the separation of the several springs at Harrogate, is that the water in wells, often only a few feet apart, stands at totally different levels, and that pumping from one well does not affect another. Whereas, if there were a common source for the water in the immediate neighbourhood, the same pressure would be exerted in all cases, the water would stand at the same level in all the wells, and pumping of the water in one well would in an equal degree affect all the neighbouring wells. If this be true then, that each spring is confined throughout its entire course to the same, or nearly the same, geological horizon as that from which it issues, its origin will be where the same strata come to the surface in the high ground to the west. The passage of the water will be after the manner of an inverted syphon ; pressure will be exerted by the superior elevation of the strata to the west, which will force the water up through the highly inclined rocks at Harrogate. The supply of water, therefore, must be derived from that which percolates the ground where the same strata come to the surface to the

west of Harrogate. This is along the Valley of the Wharfe, near Bolton and Appletreewick and beyond, being about twenty miles or more due west of Harrogate.

Again, the temperature of the waters forms what may be considered almost a direct proof that the sources of the wells are not superficial, while at the same time it also proves that they do not spring from an enormous depth. Dr. Bennett observes "that the temperature of these sulphur springs during the summer was always above that of springs of fresh water in the vicinity, and that in winter, as in the month of January, when the thermometer had fallen to 39° F., these springs were never lower than 41° F. This shows that the springs are deeply seated enough to be somewhat affected by the internal temperature of the earth, but not so deep as to be beyond the influence of the external temperature of the air, or so deep as to become what we term warm or hot springs, like those of Bath and elsewhere." Of course, this does not apply to the simple chalybeate waters, which have no peculiar features other than those common to the ordinary class of springs, some of which are freely acted upon by changes of temperature.

The next point to consider is the different qualities of the water, and how this difference is occasioned. For this purpose the division into four classes is exceedingly useful. If we look at a geographical map we see that all the springs of Class I., the strong sulphur water, issue from some of the lower strata which occur at Harrogate, in fact, a short distance of the roadstone either above or below it.

Class II., the mild sulphur waters, issue also through lower rocks, but the majority, and, in fact, the principal wells of this water, are to be found coming from some of the highest strata that occur in the neighbourhood.

Class III., the strong saline waters. Although there are only two springs of this water, both issue from the same bed, and probably from the same portion of it.

Class IV., the pure chalybeate waters, rise irrespectively from both high and low measures, although some of the principal springs of this water issue from the highest strata, that is, the millstone grit.

Each class of springs, then, in a general way, issue from different groups of strata ; apparently there are exceptions to this rule, but I believe they are only so in appearance. For instance, the chalybeate springs which rise near the Bogs Field seem to issue from the rocks in that neighbourhood, which are some of the lowest beds in the district. This I think is not the case ; it is more probable that they rise in higher strata to the north or south, and are kept beneath the surface of the boulder clay, which we know to occur in that locality, until they issue through the peat of the Bogs Field.

Accepting the hypothesis then, that each class of springs issue from, and are confined to, distinct bands of strata throughout the greater part of their entire course, it does not seem difficult to account for the difference in quality of each of these groups. But if, on the other hand, we suppose that there is a common repository for all the wells, and that the water reaches the surface by faults and fissures in the strata, why is it that there is so much difference between these four classes of water ? For surely, if the supply were drawn from all sorts of strata indiscriminately, the chemical peculiarities would become mingled and there would be nearly the same constituents in all the springs. Again, if the chemical impregnation of the water took place in its passage to the surface through joints and fissures, the sources from which it would derive its supply of salts must be comparatively near the surface, the amount would be but limited, and the quantity dissolved by the water would perceptibly diminish in course of time. But we know that this is not the case, for several of these wells are recorded to have flowed for hundreds of years, and are known to give off an enormous amount of saline matter ; Mr. Thackway's wells alone producing as much as fifteen tons of salt in the year.

The stores from which these springs derive their saline matter must extend over a large area, and such an area is afforded by the shale series, which occurs at a short distance below the surface to the west of Harrogate. There are throughout this area undoubtedly several instances of the thinning out and alteration of the different beds, but they

would probably occur at some little distance from Harrogate and would in no way affect the distinct qualities of the water, which would not have been acquired until the springs had become confined to distinct channels. The chemical peculiarities of the water are such that we have no reason for supposing any source other than what these shales could supply when exposed to the action of water.

Taking all these things into consideration, it seems the simplest and most probable theory—for theory it must be—firstly, that each spring has its own independent source, with which it is connected by a separate and distinct channel formed by the alternating series of pervious and impervious strata which connect Harrogate with the hilly region to the west, for it is only from such a source as this that a large body of water could flow year after year with such slight alteration, both in quantity and quality; secondly, that the chemical impregnation of the water is caused during its passage through these strata, and that it is from this source that the bases of all the salts are derived.

In conclusion, let me observe that I do not offer this short exposition as an exhaustive treatment of the subject; my object has been rather to draw attention to the phenomena of these wells and to point out that their source need not be at any extraordinary depth, while at the same time it certainly is not at the immediate surface.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

THE PROPERTIES AND THERAPEUTIC USES OF THE HARROGATE WATERS.¹

BY FREDERICK LEVER, B.Sc., M.B., B.S.(LOND.).

President of the Harrogate Medical Society.

MR. PRESIDENT, LADIES, AND GENTLEMEN,—The Harrogate Medical Society have entrusted me with the pleasing duty of welcoming to Harrogate the members of the Balneological Society and those guests who have travelled here to meet them. The natural resources of Harrogate and its immediate neighbourhood are so varied and extensive that it will hardly be possible, with the short time at disposal, for you to visit all the mineral springs, eighty of which rise in the district, no less than thirty-six being grouped together in the Bogs Field. You will, however, have an opportunity of seeing, and I hope of tasting, the most important and efficacious of our waters at their natural sources. In the same way the number and variety of the baths and other appliances for treatment comprised in the three Corporation establishments would require more time for careful inspection than is available, but arrangements have been made by which all the more important and typical of these will be shown, and their use explained and demonstrated by bath officials who administer them. You will, I am sure, appreciate the consideration shown by the Mayor and Corporation in closing these establishments to the public, so that the members of your Society may have full opportunity to inspect them this afternoon, as even such a short interference with the regular administration of baths necessitates a good deal of inconvenience and some pecuniary loss. Neither labour nor expense has been spared in bringing the Harrogate Baths

¹ Read before the Meeting of the British Balneological and Climatological Society at Harrogate, May, 1908.

thoroughly up to date, and periodical visits to the Continental spas have been undertaken, with the result that most of the new methods in use there have been from time to time looked into, and those most suitable for adoption here have been installed. At the conclusion of this meeting you will be invited to walk through the different departments in small parties, accompanied by members of our Medical Society, who will no doubt be able to arrange so that your time will be spent to the best advantage. Subsequently you will be able to see the principal mineral springs which rise in the immediate neighbourhood, and it has been thought advisable to give here a short and concise account of their properties and uses. The full analysis of the different waters, published by the Corporation of Harrogate, will be in your hands, so that I need not weary you with any voluminous chemical data, but rather try to explain shortly how they can be classified, and how the classes differ in their therapeutic uses.

The peculiarity of Harrogate as a health resort lies in the extraordinary variety of its mineral waters, and their consequent adaptability to quite different types of disease. Harrogate is, in fact, several spas rolled into one. The waters fall into two broad groups—sulphur waters and iron waters. The sulphur waters comprise, first, muriated sulphur waters, strong and mild; second, alkaline sulphur waters; and third, an alkaline muriated water containing only a trace of sulphur. The muriated sulphur waters contain sodium sulphide, sulphuretted hydrogen, chlorides in excess, and other salines. To this class belong the strong and mild sulphur waters at the Royal Pump Room, the strong and mild Montpellier sulphur waters, the Sulphur Well No. 36, and the magnesia water. The alkaline sulphur waters contain, besides the sulphur constituents, carbonates in excess. To this class belong the Beckwith, the Harlow Car, and the Starbeck waters. The alkaline muriated water, containing only a trace of sulphur, is represented by the Crescent Saline Spring. As a type of the strong muriated sulphur waters the old Sulphur Well at the Royal Pump Room may be taken. In action

it is aperient or purgative, according to dose. It has a markedly stimulating action on the flow of bile (and inferentially on the other functions of the liver), as proved experimentally, and increases nitrogenous metabolism, as shown by an increase in the excretion of urea. It has a slightly reducing action on the hæmoglobin contents of the blood, an effect proved to be due to the sulphuretted hydrogen it contains, and which does not occur if this gas be driven off from the water before it is taken. It is used in the treatment of functional disorder of the liver, the so-called hepatic inadequacy; in catarrhal jaundice, cholecystitis, and gallstones; in the gouty state, especially when this is associated with high living, being perhaps of more value as a preventive of acute gout than as a remedial agent during an attack; in chronic rheumatism, and in fibrositis; in anæmia of toxic origin, such as fæcal anæmia; and lastly, in skin diseases, especially in the eczema of gouty subjects and in seborrhœic eczema. It is a remarkable fact that patients can take a strong aperient, like the old sulphur water, daily for weeks without experiencing any depression — a fact, rightly or wrongly, attributed to the considerable charge of barium chloride it contains. The strong sulphur waters are contra-indicated in cases of chronic renal disease with high arterial tension, and especially if œdema be present, the demand made upon the kidneys for the excretion of excessive quantities of chlorides being greater than can be met. As types of the mild muriated sulphur waters the mild sulphur or the magnesia water may be taken. These contain similar salines to the strong waters in smaller quantities and differing proportions. They are actively diuretic, especially the magnesia water, and are used to promote elimination of waste products by the kidneys, *pari passu* with the elimination by the bowel following a morning dose of the stronger waters; or are given alone to delicate and debilitated subjects suffering from gout or rheumatism, for whom it would be undesirable to prescribe a stronger water. In gouty albuminuria and glycosuria they are found to diminish the quantities of albumin and sugar respectively; they are also used in cases of gravel, oxaluria,

and chronic cystitis. The alkaline sulphur water and the alkaline muriated or saline water given by the mouth are useful in chronic gastro-intestinal catarrh; and given by the rectum in the form of douches to the colon, are extensively used in the treatment of muco-membranous colitis, chronic appendicitis, and chronic constipation, the methods being similar to those adopted at Plombières. Externally, the sulphur waters derived from a number of springs not used for drinking are employed in the form of baths, both for their effect on the circulation in cases of gout and rheumatic manifestations, such as sciatica, lumbago, &c., and also for their effect on the skin in many forms of skin disease. The different strengths available, from the soothing alkaline and mild sulphur up to the stimulating strong sulphur baths, are well adapted for the treatment of skin diseases in various stages. The iron waters of Harrogate, somewhat overshadowed by the popularity of the sulphur waters, have scarcely been so widely known as they deserve, though in the absence of sulphur water they alone would suffice to give repute to the Spa, and were, indeed, the first waters to be discovered and used here. They consist, first, of saline iron waters represented by the Kissingen spring, which contains sodium chloride in excess, ferrous carbonate, magnesium chloride, also a small quantity of barium and carbonic acid gas; and second, of strong and mild chalybeates, the most important being one of the strongest natural iron waters known, the chloride of iron well, also the carbonate of iron and the Alexandra springs. The chloride of iron water contains both ferrous chloride and carbonate in large quantities, also barium chloride and carbonic acid gas. All these strong chalybeates, and notably the chloride of iron spring, have been shown experimentally to increase the quantity of total solids in the bile, to augment the output of urea, and, as might be expected, to enrich the hæmoglobin content of the blood. The mild chalybeate waters contain iron in fractional doses, and are well adapted for administration to children suffering from anæmia or glandular enlargements. The Kissingen water is frequently given, after a course of strong sulphur water, as a

tonic ; it is prescribed in debilitated cases of gout, especially if anæmia be a prominent symptom ; and as a general tonic in convalescence from acute illness, and in neurasthenia. The chalybeate waters are much used in the treatment of chlorosis and secondary anæmia, in debility and malnutrition of children, and in surgical tuberculosis.

From the foregoing it will be seen that the statement as to the waters of Harrogate being adaptable to the treatment of widely different types of disease is abundantly justified, and inspection of the magnificent suite of baths will satisfy you that no means for their external application have been neglected. Another advantage which Harrogate possesses may be emphasized, and that is its altitude and the peculiarly bracing character of its climate ; for to this is largely due the fact that patients are enabled to go through even a severe course of waters without experiencing undue enervation or depression, and thereby the necessity for any form of after-cure is avoided. We hope that this meeting of the Balneological Society may be a very pleasant and successful one, and that you may all individually enjoy what Harrogate can offer as a pleasure resort, as well as inspecting it as a health resort, and that you may not carry away any remembrance of being afflicted with unduly long papers and dry details during your stay among us.



Photograph by]

[Elliott & Fry

WILLIAM BOWEN-DAVIES, M.R.C.S.

Obituary.

WILLIAM BOWEN-DAVIES, M.R.C.S., L.R.C.P.,
LLANDRINDOD WELLS.

A Former President of the Society.

MUCH regret has been expressed by the Fellows of the Society at the death of Dr. W. Bowen-Davies, of Llandrindod Wells, one of the founders of this Society, and who after acting for some years as a member of the Council and as Vice-President, fulfilled the duties of President of the Society in the session 1904.

He died on April 24, at his residence at Exmouth, which he had named "Gorphwysfa" (the Welsh name for resting-place). For the past few years he had been suffering from a cardiac affection, which compelled him to relinquish his practice in July of last year and settle in Devonshire. Indeed, he ought to have given up his work earlier, but his indomitable energy kept him going, and he hoped that he would die in harness.

William Bowen-Davies was born at Llandingat, Carmarthenshire, on April 26, 1847. He was educated at Llandovery College, and was a student of St. Bartholomew's Hospital. He obtained the diplomas of M.R.C.S., L.R.C.P., and L.S.A., in 1870-1, and then became Medical Officer to the General Infirmary, Jersey.

In 1872 he commenced practice at Llandrindod Wells, then only a small hamlet without any resident medical practitioner, but he was always convinced that it would rise to prominence among the health resorts of Great Britain. He was appointed Poor Law Medical Officer for a wide district, and a few years later the first Medical Officer of Health, a post which he held till the formation of the urban district of Llandrindod Wells. For years he worked hard as a general practitioner, and soon gained the confidence and esteem of the neighbouring gentry, and the love of the poor, to whom he

gave the best of his care and skill, often riding for miles over the hills to attend them. In 1881 he took a prominent part in the establishment of the Llandrindod Wells Convalescent Home and Cottage Hospital, and became the Medical Director and Honorary Secretary. He filled both these offices with great energy for many years, and continued as Medical Director till 1903, when he was appointed Consulting Physician.

He was President of the Shropshire and Mid-Wales Branch of the British Medical Association in 1884-5, choosing as a subject of his presidential address, "Llandrindod Wells as a Health Resort," in which he gave a lucid account of the value of the mineral waters.

During this time Llandrindod Wells was becoming more and more widely known as a health resort, owing in great measure to the efforts of Dr. Bowen-Davies, who devoted his time during the summer months almost entirely to work among the visitors, among whom he had a very large connection, many of them returning to consult him year after year; the thoroughness with which he entered into each case, coupled with his cheery and genial manner, won for him the highest personal regard. He devised a simple and effective method of note-taking that enabled him to keep a continuous history of his patients, which proved invaluable. He was a capable physician, and a courteous man, beloved alike by his friends and patients. His professional work was his delight; he spared no pains, and grudged no time, and taxed his iron constitution to the utmost during the press of work in the summer season. To counteract this, for several years he took a winter holiday abroad, spending it in Egypt, Palestine, or the Canary Isles, the latter being his favourite resort.

In politics Dr. Bowen-Davies was a staunch Conservative, and was deeply attached to his native land; he took a lively interest in every movement which tended to the progress of his fellow-countrymen, and was one of the promoters of the first Eisteddfod held at Llandrindod.

He was a staunch Churchman, and for considerably over thirty years filled the office of churchwarden of Holy Trinity Church, in the many improvements and enlargements of

which he took great interest. In memory of him it is proposed to build a new aisle in the church, and appreciation of his past services has already taken a practical form in subscriptions from his patients and friends.

In 1879 he married the second daughter of Mr. William Ranklin, of Handsworth, Staffordshire, by whom he had two sons and four daughters, all of whom survive him.

He was a keen lover of Nature, and had made a careful study of botany, and delighted in country rambles with his children, which he made full of interest, as the haunt of every flower and rare fern on the surrounding hills was known to him. He also had an intense love for animals.

In addition to his work as a physician, Dr. Bowen-Davies never spared himself in any effort to promote the welfare of the place in which he lived. He was closely associated in the establishment of the first elementary school, and in subsequently securing a county school for Llandrindod; he was one of the first members of the Radnorshire County Council, and became a member and afterwards Vice-Chairman of the Radnorshire County Governing Body. He was also the first Chairman of the Llandrindod Local Board, and subsequently of the Urban District Council. In 1896 he was placed on the Commission of the Peace for the county, being the first local resident magistrate. One of his last interests was the formation of a new golf club, now a highly successful undertaking, of which he was the first President.

He was buried in the cemetery at Llandrindod Wells, in the arrangements for the construction and laying out of which he had taken infinite pains. The first part of the burial service was held at Holy Trinity Church, and he was followed to his last resting-place by a large gathering of friends and townsmen who were desirous of paying their last tribute to one who had shown such public spirit, and to whose strenuous efforts the Llandrindod Wells of the present day owes its foundation.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

ORDINARY Meeting held at 20, Hanover Square, W., on Wednesday, March 4, 1908, at 5.30 p.m., the President, Dr. TYSON (Folkestone) in the chair.

Amongst the visitors was Dr. Leon Blanc, of Aix-les-Bains.

The Minutes of the last meeting were read and accepted as correct.

The following candidates were elected by ballot :—

W. G. Silvester, L.R.C.P., L.R.C.S.Edin., Leamington Spa.
A. Miller Kerr, M.B., Ch.B., Havod Awen, Llandrindod Wells.
W. T. Rees, M.R.C.S.Eng., Bank House, Builth Wells.
J. A. Morgan, M.R.C.S., L.R.C.P., Bryndern, Llanwilyd Wells.
R. McLeod Veitch, M.D.Edin., Thorner House, Esplanade, Harrogate.
F. Lever, M.B., B.S., B.Sc.Lond., Montpellier Lodge, Harrogate.
F. W. Garrad, M.R.C.S., L.S.A.Eng., 50, Coldbath Road, Harrogate.
Jas. Rutherford, L.R.C.P., L.R.C.S.Edin., 12, York Road, Harrogate.
Harry Clough, L.S.A.Lond., 16, Duchy Road, Harrogate.
H. W. Malim, M.B., B.C.Cantab., North Park Road, Harrogate.
D. Durward Brown, M.R.C.S., L.R.C.P.Lond., Harrogate.
C. E. Pronger, F.R.C.S.Eng., Litchdon, Harrogate.
G. T. A. Atkinson, M.B., C.M.Edin., North Park Road, Harrogate.
H. C. Nixon, M.D.Edin., Willet Haynes, Harrogate.

Dr. GEORGE CARPENTER read a paper on "Seaside Treatment for Sick Children." The following Fellows took part in the discussion: Dr. Tyson (Folkestone), Dr. Street (Westgate), Dr. Bagshawe (St. Leonards), Dr. Gurney (Eastbourne), Dr. Leonard Williams, Dr. Styles (Moreton-in-Marsh), and Dr. Ackerley (Llandrindod Wells). Dr. Carpenter replied.

COPY OF MINUTES.

ORDINARY Meeting (Provincial) held at Harrogate, May 16, 1908. The Fellows were received in the Spa Room of the Royal Baths by the Mayor (Dr. Nevill Williams), the Chairman of the Baths and Wells Committee (Alderman Milner, J.P.), the Town Clerk, Dr. Mouillot (the Provincial Secretary of the Society), and by Dr. Solly, the President-elect.

The proceedings were opened by the Mayor, after which

the President, Dr. TYSON (Folkestone), took the chair. About 100 Fellows and guests were present.

The Minutes of the last meeting were read and signed as correct.

The following candidates were elected Fellows :—

C. V. Craster, L.R.C.P., L.R.C.S., D.P.H. (Cantab.), 62, Woodstock Road, Chiswick.

Neville Wood, M.D., M.R.C.P., 42, Elvaston Place, S.W.

Shepherd M. Boyd, F.R.C.S.I., L.R.C.P.I., Harrogate.

E. Leonard Adeney, M.D., Tunbridge Wells.

J. P. Lockhart Mummery, M.B., F.R.C.S., 10, Cavendish Place, W.

John Hackney, M.D., Hythe.

James Herbert McKee, M.B., 1, Victoria Avenue, Harrogate.

G. L. Kerr Pringle, M.D., 2, Springfield Avenue, Harrogate.

Mr. C. FOX STRANGWAYS then read a most interesting paper on "The Geology of Harrogate in relation to its Mineral Waters."

The Mayor of Harrogate (Dr. NEVILLE WILLIAMS) proposed, and Dr. BAGSHAW seconded, a vote of thanks to Mr. C. Fox Strangways for his paper.

Dr. FREDERICK LEVER, President of the Harrogate Medical Society, then read a paper on "The Harrogate Waters and their Therapeutics."

The PRESIDENT thanked Dr. Lever in the name of the Society for his paper.

Tea was then served in the Spa Room, and the members were escorted over the Royal Baths, the Pump Rooms, and the Bogs Field.

At 7 p.m. 135 Fellows and guests dined together at the Hotel Majestic, and several ladies were present. The toast of "The Town and Corporation, and the Medical Profession of Harrogate" was proposed by the PRESIDENT, and was responded to by the MAYOR and by Dr. EDGECOMBE.

The toast of "The British Balneological and Climatological Society" was proposed by Alderman MILNER, J.P., Chairman of the Baths and Wells Committee, and was responded to by Dr. BAGSHAW, Chairman of Council, and by Dr. LEONARD WILLIAMS, Editor of the JOURNAL OF BALNEOLOGY AND CLIMATOLOGY.

Dr. EDGECOMBE, in the course of his speech, said the spas and watering places of this country owed a debt of gratitude to the British Balneological and Climatological Society for the work they had done and are doing in driving home to the minds of the medical men of this country the fact that here in the British Isles we have spas of equal, if not superior, value to any of those abroad, and that many patients hitherto sent abroad can be equally well treated at a home resort. He also considered that those members of the profession who practise at health resorts are under a deep obligation to the Society for its work in helping to raise spa treatment from the slough of empiricism to the domain of rational and scientific therapeutics.

The Fellows were then entertained at a concert at the Kursaal.

On the following day (Sunday, May 17), eighty-four Fellows and guests attended service at Ripon Cathedral, and the Dean of Ripon preached a sermon, the subject being "The Pool of Bethesda." After the service, Dr. Green, Medical Officer of Health for Ripon, conducted the Fellows over the Ripon Spa Baths, where the Mayor of Ripon (Mr. Bower), and Alderman Wells, Chairman of the Spa Committee, received the party. The Fellows were entertained at luncheon at the Spa Hotel by the proprietors. Afterwards a visit was made to Fountains Abbey, by permission of the Marquis of Ripon.

On returning to Ripon, the Mayor entertained the party at tea at the Spa Hotel, and later the Fellows returned by train to Harrogate.

This meeting was most instructive, enjoyable and successful, and the fact is now firmly established that Provincial meetings are very popular with and much appreciated by the Fellows of the Society. On this occasion, several of the Fellows were accompanied by their wives and daughters.

The arrangements for the convenience and enjoyment of the Fellows and guests, under the direction of Dr. Mouillot and Dr. Garrad, were perfect, and the thanks of the Fellows are due to them for having carried out so completely the intentions and wishes of the medical profession of Harrogate and Ripon in extending such a hearty welcome to the Society.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

COPY OF MINUTES.

AN Ordinary Meeting was held at 6 p.m. on Friday, June 19, at 20, Hanover Square.

The Minutes of last meeting were read and confirmed.

The following candidates were nominated for ballot at the next meeting :—

Arthur Gerald Welsford, M.D., F.R.C.S., D.P.H., The Spa, Strathpeffer, N.B.

Geo. W. Thompson, M.B., F.R.C.S., 80, Harley Street.

Joshua J. Cox, M.D., 38, Deansgate, Manchester.

John Curtis Webb, M.A., M.B., B.C. (Cantab.), M.R.C.S., L.R.C.P., 24, Bina Gardens, S.W.

C. W. Jones, M.B., C.M. Edin., 9, Terrace Road, Buxton.

Arthur J. M. Bentley, M.D., C.M., M.R.C.S. (Eng.), Helouan, Egypt.

The following were elected Fellows by ballot :—

W. Williams, M.D., D.P.H., Bryn Dern, Penarth, S. Wales.

Thos. Davey Duke, M.B., F.R.C.S. Edin., 6, Belford Terrace, Edinburgh.

Henry Treves Barber, M.D., B.Sc., 20, Rue de l'Arquebuse, Geneva.

H. Crichton Miller, M.A., M.D. (Edin. and Pavia), Villa Mary, San Remo.

George Benington Wood, M.B., C.M., Newlands, Sandown, I.W.

A. E. E. Reboul, L.R.C.P., L.R.C.S. Ed., L.F.P. & S. Glas., Villa les Bluets, Chatel Guyon.

An address was then delivered by JAMES GOODHART, Esq., M.D., F.R.C.P., entitled "Let there be Light." The PRESIDENT proposed, Dr. BAGSHAW seconded, and Dr. FORTESCUE FOX supported a vote of thanks to the lecturer.

Dr. FOX considered Dr. Goodhart's address would stimulate balneological enquiry in Great Britain, and some specific points would bear fuller treatment and investigation: for example, his generalization that on the whole spa treatment was not suitable for young subjects was new and suggestive, and could profitably be examined in detail. Balneological experience would suggest exceptions in certain important classes of cases. Dr. Goodhart's address was also valuable

as calling attention to the fact that the health resorts should be really seats of learning. The President, Dr. Tyson, had already at the Harrogate meeting sketched out this true ideal. At these places there was gathered together a unique mass of clinical material, and it was the duty of the practising balneologist to patiently investigate the field of chronic ailments. In this work he encountered many difficulties, and he (Dr. Fox) hoped it would be among the functions of this Society more and more to stimulate and assist the balneologist's endeavours.

At 7.30 p.m. on the same evening, the Annual Dinner of the Society was held at the Trocadero Restaurant, when Sir Thomas Barlow and Dr. George Eastes were guests of the Society.

The toast of "The Society" was proposed by Dr. LEONARD WILLIAMS, and replied to by Mr. KEETLEY and Dr. HAMILTON CUMMING (Torquay). Dr. Leonard Williams, in the course of his remarks, said: It was no idle boast to say that before the inception of this Society the study of balneology and climatology did not exist in this country. We had endeavoured and we had succeeded in lifting these therapeutic measures out of the mire of pseudo-quackery in which they had too long wallowed, into the domain of rational, straightforward, scientific branches of professional work. The papers which had been read before us and the articles which had appeared in the Journal during our twelve years of existence were real contributions to the elucidation of the many problems which surrounded the therapeutics of baths and climates. These therapeutic measures were destined in the future to play a very large part in the treatment of chronic disease, and we had deserved well of our professional brethren in placing at their disposal the results of the work which was being done in these matters.

The toast of "The Guests" was proposed by the PRESIDENT, and responded to by Dr. GEORGE EASTES. The PRESIDENT, in the course of his remarks, said he wished that the guests and the profession generally should more thoroughly understand the great work the Society was doing

for the promotion and extension of the knowledge of all health resorts, English and foreign. The efficient study of health resorts, from a balneological and climatological standpoint, required much time and experience. The study took in the whole range of medicine, and it required well-trained and thoughtful physicians to put into practice all the advantages that were possible in our well-equipped spas and marine towns.

The advising of the choice of health resorts, it appeared to him, should be in the hands of those who know intelligently the various qualities and adaptabilities of the many spas. To send patients away, often to a distance or abroad, without very carefully considering all the conditions of the patient and the place recommended, seems to be unscientific treatment ; and yet this method is not infrequently followed.

Our Society is ever willing to communicate its special knowledge to those who require it, and, he trusted, would in the future be looked upon more and more in the light of a consultant in its own special department.

The toast of "The President" was proposed by Sir THOMAS BARLOW.

A musical entertainment was then provided by the President, and the Fellows and guests spent an enjoyable evening.

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

REPORT OF COUNCIL FOR SESSION 1907-8.

THE Council have pleasure in placing before the Fellows the Twelfth Annual Report of the doings and progress of the Society.

Six meetings have been held during the past session, five in London and one at Harrogate.

Dr. W. J. Tyson, of Folkestone, has occupied the presidential chair with exceptional distinction, in the place of Dr. Joseph Groves, who had been elected President at the commencement of the session, but who, to the regret of all, died before taking office.

Dr. Tyson's presidential address, delivered at the October meeting, was entitled "Some Thoughts about our Society and its Work," and was much appreciated by the Fellows present.

During the session the Society has lost by death Dr. Bowen Davies (Llandrindod Wells), a former President; Dr. Hugo Daniell (London); Dr. Greenway (Llandrindod Wells); and Dr. Lorimer (Buxton).

Forty-two new Fellows have been elected, and twenty-seven resignations are reported, the number on the Roll now standing at 390.

In May, 1907, an address was delivered by Dr. Norman Moore on "Air, Water and Situation." Dr. N. Moore afterwards dined with the Fellows as their guest. In December, Dr. Edgecombe read a paper on "Blood-pressure in Spa Practice," which evoked such an interesting discussion that the subject was re-introduced by Dr. Fortescue Fox, and again discussed at the next meeting in January. In March, Dr. George Carpenter read a paper on "Seaside Treatment for Sick Children," which also gave rise to a very instructive debate.

The Third Provincial Meeting took place at Harrogate.

Dr. Mouillot acted as Local Secretary, and, assisted by other local Fellows and members of the profession, made admirable arrangements for the convenience and comfort of the visitors. The Fellows were received by the Mayor (Mr. Neville Williams) and by the Corporation of the town, and most of them stayed at the Hotel Majestic for the week-end (May 16-18).

Mr. C. Fox Strangways read a paper on "The Geology of Harrogate in Relation to its Mineral Waters," which was followed by one from Dr. Frederick Lever, President of the Harrogate Medical Society, on "The Properties and Therapeutic Uses of the Harrogate Waters."

In addition to inspecting the Baths at Harrogate, the Fellows were also conducted over those at Ripon by the Mayor and chief officials of the latter town.

On the Sunday, divine service was attended in Ripon Cathedral, when the Dean of Ripon preached; and in the afternoon Fountains Abbey was visited by kind permission of the Marquess of Ripon.

The success of the provincial meetings is now firmly established, and as there is no doubt that they are extremely popular with the Fellows, the Council recommend their continuance.

Notes and News.

MRS. SYMES-THOMPSON, widow of the late Dr. Edmund Symes-Thompson, a former President of our Society, has recently published a book entitled "Memories of Edmund Symes-Thompson," published by Elliott Stock, 62, Paternoster Row, price 3s. 6d.

There must be many Fellows of this Society to whom this book will be of interest. It will be remembered that Dr. Symes Thompson took a very prominent part in the affairs of the Society from its foundation, and the Fellows always look back with pleasure to his most successful year of office (1902-1903) as first London President of this Society, during which year they had the pleasure of making the acquaintance of Mrs. Symes-Thompson at the delightful *conversazione* in Cavendish Square, at which she presided as hostess.

BOURNEMOUTH.

THE Bournemouth Hydro., West Cliff, deserves attention as a very comfortable place of residence for those requiring both electrical or massage treatment. The position is quite unique, with fine spacious balcony and covered-in lounge facing the Bay. There has recently been a very spacious ball-room added, and altogether the arrangements are very complete for those seeking either treatment or convalescence.

BUXTON.

FOUR years ago the Buxton Mineral Baths were taken over from the Duke of Devonshire by the Urban District Council, and as a result of this change many additions and improvements have been made. Among the most successful of the new baths are "Moor" baths, on the model of those in use at Carlsbad, and at Homburg. The "Moor," or peat, is

obtained from the moors which stretch for many miles to the west and north of the town, and is exceptionally rich in organic acids. It is applied locally in the form of packs, as well as by means of baths. The similarity of the Buxton water to that of Plombières renders it most useful for that form of intestinal lavage to which the name of Plombières has become attached; excellent results are obtained, equal undoubtedly to those obtained at Plombières itself. Another new use of the water is in the form of a fine spray douche for application to the nose and throat after the method in use at Mont Dore; this is very useful in gouty pharyngitis and many other rheumatic and gouty states. The natural thermal water is used, and the contents, gaseous and saline, are driven, in the form of vapour, deep into the air passages; probably the radio-active properties of the water are of great importance in respect of this mode of treatment. When to these are added the immersion, massage, and douche baths, and the innumerable electrical methods of treatment already installed, which go nowadays to make up a completely equipped spa, it will be evident that Buxton is making great strides in progress.

CHURCH STRETTON.

THE season at Church Stretton has opened well, and there is every prospect of a successful one; the summer foliage much enriches the picturesque beauty of its rugged heath-clad hills and long fertile valley, while the weather has been, on the whole, sunny and warm.

The rainfall for 1907, an unusually wet year everywhere, was 35·65 inches, the *local* death-rate is 13·6 per 1,000, which is below the average rate for England and Wales.

The zymotic death-rate is 0·76 per 1,000; the water supply is abundant, and is noted for its great "softness" and exceptional purity, the storage capacity of the new reservoir being about 12,000,000 gallons. The local authority is contemplating the establishment of a meteorological station for the systematic recording of rainfall, temperature, sunshine, and

humidity; attention is being paid to road-cleansing and dust-laying, and the general sanitary condition of the town is thoroughly up-to-date.

The amusements at "Stretton Spa" are both varied and healthy, there are excellent golf links, some 1,200 feet above sea level, a good 18-hole course, well-made roads for motoring and cycling, many delightful carriage drives to historic and picturesque scenes, hill-climbing on trained ponies, lawn tennis, croquet, archery, bowls, and fishing, while there are numerous shady walks where invalids can enjoy quiet and rest. Church Stretton affords a magnificent field of study to the botanist, the entomologist, the geologist, and the anti-quarian, not to mention much pleasant scope for brush, pencil, or camera.

WOODHALL SPA.

WOODHALL SPA is just now looking its very best, the pine woods being in full foliage, and the flowers, for which the locality is famed, are making a brilliant show. Ever since the middle of May, with few exceptions, the weather has been most favourable for bathers, while motoring, golf, tennis and cricket are in full swing. Musical and other entertainments have been provided, so that a visitor need never be dull.

The baths have been much improved this season in view of the steady increase in the number of visitors who come for the special mineral baths for which Woodhall Spa has already become famous, and new forms of accessory treatment are added each year so as to keep them up to date.

So far, the present season promises to be a very successful one.

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BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL
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ANNUAL ADDRESS

BY JAMES F. GOODHART, M.D., F.R.C.P.
Consulting Physician to Guy's Hospital.

“LET THERE BE LIGHT.”

IF ever there was a case of the blind man attempting to lead the blind, I come before you to-day in that position. I would even venture to accentuate this confession by saying that whatever you, my hearers, may be, he who addresses you is stone blind. I do not doubt that you all well recognize this, and, I suspect, have not a little curiosity as to how I propose to fence with my ignorance. My purpose is to recognize it frankly, and expose it openly to the light of day. So let us speak in chief measure of the many difficulties of the subject upon which you have asked me to address you.

Climatology and balneology are by no means identical in aim, nor shall I attempt to decide as to the relative importance of each, but from the point of view which I propose to take they may, for the afternoon, be considered very much in common.

As to the importance of climatic conditions in their effect

upon disease, I take it that we are all agreed. The difficulty is to say when and how these conditions act, and what is the effect in the given case. That the effect is very positive any number of illustrations might be given to show.

Some years ago, in giving an address in the north of England, I introduced the subject of the fear of death, and contended that it had been greatly exaggerated, because I had seldom been asked the question, "Am I going to die?" by anyone who was gravely ill. After the meeting, a physician of great experience, practising in the neighbourhood, said he did not agree with me. He was frequently asked the question, and he took it that the climate of the north of England produced more grit than did the south. In a leading article in the *Times*, only the other day, on the Mohmand rebellion, the fact that some of the clans had fought better by far than others was attributed, without question, to the fact that the *fighters* had remained in the upland; those that had gone *soft* had long lived in the plains. The Icelander requires tallow and blubber as necessary articles of food—we should have a difficulty in making both ends meet upon them; and this reminds me of another interesting fact I noticed many years ago, that whisky, although very largely indulged in, I believe, in Scotland, very seldom there leads to cirrhosis. In England, we know it does so frequently; and it is said to have much to do, in tropical climates, with abscess of the liver. I ought to add that having made this statement years ago in print, and being subsequently asked for further information on the subject, I wrote to the late Sir William Gairdner telling him my experience and asking him if he could confirm it; and he replied that he believed my statement to be correct as regards the rarity of cirrhosis in the north, but that (this, no doubt, with a twinkle in his eye) he thought the reason might be that the "Scotch" up there was better than what we drank in England!

Talking of Scotland reminds me also of two other illustrations. Some few years ago a man came to me who had all the aspects of advanced malignant disease of the liver. He was deeply jaundiced with a very large liver, which, from its

general characteristics, left no doubt in my mind of the nature of the disease. His one cry was, "Let me go to Scotland, and I shall get well." He was too ill, I considered, to go so far, but at last I gave way if he would consent to take his doctor with him. This he agreed to do. He went, speedily began to mend, and got quite well within a few weeks, and he has been well ever since. But do not suppose that I claim that the climate of Scotland can cure a cancer; the diagnosis was, of course, a mistake, and should have been, perhaps, that of gall-stone or pancreatitis (although I have long contended, and as it falls in with one of the main intentions of this address, I may as well say so again, that we are far too *mechanical* in our doctrines of jaundice). There is many a case that is paralytic and not obstructive, functional and not organic, and such a case the Highland air might well, upon occasion, turn towards health.

It falls to my lot to see a fair number of the enervated from the tropics. They mostly come for an overhaul on their first arrival, and to know whether they shall repair to Karlsbad as they have usually been told to do. My experience is that many a man, if only he can get off to the Highlands, will need no physic, not even waters, and the dove returns not again to the ark of medicine.

But how absolutely ignorant we are of the causes of such effects. We are, all of us, daily using the terms "bracing" and "relaxing." We know what we mean as a subjective sensation, and we see the effect in the objective renovation. But what has been the cause? Take Brighton, for example, because it so often affects people as to make them headachy, giddy, rheumatic—bilious, in a word, as it is called. The climate is obviously of a peculiar character, yet for those whom it suits there is no place more invigorating. I know of places—you all know plenty more—good residential sites for the many, yet at which some who live there declare that when in residence every scrap of energy and *joie de vivre* has departed from them. At Kimberley, I am told, a great number of the obese become glycosuric.

Take another large class of people, those whose intestinal

action is barometric, may I call it? I mean those who are liable to diarrhœa at the onset of change of weather. Who does not know that one humble corn will take off the edge of the joy of a lifetime? A friend said to me the other day that I must not ask after his health when the wind is in the east—dear old Mr. Jarndyce is a representative of no uncommon experience. Think, too, of the extraordinary effect that a thunderstorm will have upon some nervous centres, reducing them to a state of absolute collapse; and then carry your minds further, and what may this not mean in the mutual relationship of electrical energy and health?

I often think we have lived too soon. We are now beginning to have some dim insight into electrical force, and in it one seems to see how near we are to handling nervous energy, and then—ah! then indeed!—if this knowledge were ever to become our own, the mind might well wander on to that moment of time which has captivated thought in every age, whether sceptic or faithful, when decay and death might be swallowed up in life.

But without being quite so visionary as this, it is my purpose to contend that, with an advancing knowledge, the question of climate is not only intensely interesting, but also potentially important, and lands us almost in the position that *nothing*—even water-finding—is impossible. While I was considering how best to put before you this intricacy of our subject, there crossed my path a man well versed in the practical dealing with caisson disease. You all know that in death from it—a climatological one, so to speak—the right heart is distended by free nitrogen and the tissues are permeated with similar gas. It has been further found that stout people are more liable to be affected than the thin. And it is said that this is due to their greater capacity for holding up nitrogen in the tissues.

I do not suggest that, in dealing with disease as influenced by climate, we are ever called upon to deal with any such extreme conditions as are present in caisson disease, but I do mean to say that what exists in the one case in an extreme degree may quite possibly be present in many

another case in an imperceptible degree, and thus initiate some minute alterations of nutrition and structure that by-and-by will produce disease. We know well that the opposite of caisson disease—viz., residence at extreme altitudes—will more or less produce changes that come under the head of disease, and may call for treatment in the ordinary course; and I see no real objection to the conjecture that some climates to others may be described as mildly caissonic; or that, in an attempt to treat disease, we must study and attempt to know something about the varying conditions and degree of the interchange of gases under high and low atmospheric pressure of extremely moderate variation.

The treatment by baths is hardly otherwise in the problems it must daily offer to the physician who prescribes them. It is well recognized that the unbroken skin is a great bar to the absorption of drugs, and nothing is to be expected in this respect from any ordinary bath. Nevertheless, in the light of advancing knowledge, the possibility of very delicate reactions and interchanges needs to be considered. Certain it is that baths of various sorts are believed to effect very marked results. Many an one, for example, will take a daily warm bath in his own home with no appreciable effect, whereas, if he take one at Aix-les-Bains, he will probably tell you that he became so depressed and enervated that it did more harm than good. Needless to say that all such statements need careful sifting. Many things need to be considered besides the actual bath—nothing short, in fact, of the whole environment; atmosphere, temperature, diet, friends, doctor, even suggestion—all come in, and the exact share of each is impossible to estimate.

Moreover, we have, nowadays, to consider the effect of the various modifications of heat, electricity, and light. I saw, the other day, a doctor who, with an irritable spot on one leg, apparently of no importance, had exposed it, as he thought, with all due caution, on three or four occasions to the influence of X-rays, and slowly thereafter, many days intervening, there came a deep-seated destruction of the tissues of the leg that had kept him out of work for months. We are

all, indeed, too familiar now with those terrible cases of dermatitis that pass on into epithelioma under similar circumstances that have necessitated the removal of limbs. The *growth* of a cancer due to the repeated exposure of a part to X-rays! Such a thing cannot but make one ponder and ask one'sself what has happened to produce so determined an effect, and again, one may be forgiven for wandering on into the conjecture that what has happened in these cases, in so pronounced a manner, may possibly give a clue to like causes in a more dilute form, which, acting insensibly over far greater ranges of time, might result in similar disease, and which, on the other hand, recognized in its first state, might be corrected and so prevented.

In this sense, let me next say something having more specific reference to mineral waters in general, and our work at the watering-places whence they come. I suppose that most people would admit it to be true that all such waters are more efficacious when taken at their source—perhaps we might say when drunk on the premises—than when sold in bottle. If this be true, what does it mean? Probably, in some measure, that the composition of the water alters by keeping, and there are infinite possibilities of this sort if one tries to think of them. No doubt there are gases in minute proportion in the natural water on draught that add to its efficacy, although, as chemists, we may not be able to materialize and take cognizance of them.

I know not what the chemists may have to say about radium, but I fancy that radio-activity, and all the new knowledge derived from that source, may well have some bearing upon the potency of waters taken fresh. But at their source or not, any one of the natural mineral waters has, over and above the one or two chief constituents, many others present in minute quantity, and who shall say that one and all, in some subtle combination, are not potent to influence the habits or tendencies of our several organs, and, in so doing, to influence the very beginnings of disease?

Let me illustrate what I mean by that great coign of vantage at so many watering-places—uric acid. It is clear

that, under a variety of circumstances, particularly as we arrive at and pass middle age, our tissues acquire the habit of producing materials of this sort—products of imperfect combustion, we call them—in excess; much as if, in a furnace under the influence of modified draught, now this, now that, ash would be produced according to the circumstances dominant at the moment, and we then become those to whom the doctor applies the much scoffed at term of “gouty.” “Everyone is gouty,” says the reproachful patient. Well, that true gout is rare indeed in comparison with the number said to be gouty must be admitted. But most people after 50, some much earlier, arrive at that mildly decadent condition when their organs do not work so automatically towards the right, or so naturally make for health, as is the case in earlier years, and the blood and juices become more or less charged with impurities—a condition which needs some generally descriptive term, and which waters, in some way, seem to help to dissipate. And I can quite conceive that natural mineral waters of suitable kind may so imperceptibly, and yet definitely, modify—say the specific gravity of those juices, the storage of gases in the tissues, the activity of our regulatory nerves, the powers of our absorbents, the circulation of the fluids—that the natural habit—that is health—might be revived. For, after all, what is health, what is disease in many instances, but a habit of action on the part of the tissues. And fresh from their source, in all the virginity, the nascent activity and receptivity of their exit from the spring, one would suppose that their virtues must be readiest in power. And I may remark, in passing, that herein, perhaps, lies the reason that waters are, as I think, seldom needful to the young. *Their lives make for health*, if we watch without meddling, and so true do I hold this to be that I would hardly except the iron spas, which are certainly useful. So jealous am I to keep the young out of the range of valetudinarianism that even chalybeate waters only hold, in my estimation, the position of exceptions that prove the rule—that waters and baths are for the decline and fall, not for the rising decades of life. Nor are waters either, as a rule, for

the very ill, who need the comforts and routine of home. A course of waters, taken at their source, mostly benefits the sound person who is out of health.

But there are other elements in a cure beside the drinking of waters, which all come into question when it becomes necessary to sum up the exact value of the waters themselves. The surroundings will, in many cases, have a large share in their success. It needs no saying that there is all the difference in the world between taking brimstone and treacle when dispensed by Mrs. Squeers and when mollified by such allurements as a skilled and elegant pharmacy is able to accomplish ; between taking waters in bad weather and discomfort, and to the strains of music in beautiful surroundings, and with all the sensuous stirrings of a fine summer, or its counterfeit—a well-warmed winter garden. Ah ! there is the rub for us ! If the English summer were less fickle. The rays of the sun, its warmth, and fresh air are not things of the moment and of fashion, as passing moods might seem to suggest ; they are the everlasting sources of energy and the very springs of health. So that the more beautiful the surroundings, the more sunny the spot, the finer the weather, the more out-of-door the life, the more reposeful and pleasant the daily occupation, the more remote from the madding crowd, the better the results are likely to be. But when we consider all these details, it may well seem that "let there be light" is but a pious hope that has no reasonable chance of coming to fruition ; and so, indeed, it may be. But there is a more favourable aspect of the matter to which, as physicians at watering-places, I wish very much to direct your attention.

It is this : water cures have one inestimable advantage often missed by us in the practice of medicine. Has it never struck you that they give the doctor the chance of thinking about, and watching, life in some of its many faulty moods without worry or distraction ? The present-day mood, as I have often said, is : "I have a pain, please cure it at once," and the remedy, in one shape or another, has to be found in the chemist's shop round the corner. Another, perhaps, complains, "I have a lump, please have a look at it," and the

knife is made ready for such self-made emergencies. There is no thought of putting up with such things on the part of the patient; no chance for the doctor to observe and formulate a deliberate opinion. The result is the only one possible. We are bewildered by the multitude of drugs, restless and impatient in their use, and inconsequent in our records of their action. In the endeavour to keep up with the latest productions we are ever testing the new and forgetting the old ones (fortunately, many of them had better be forgotten), but there are many good drugs that are simply buried by the piled-up leaf-mould of those that have come after them. We run about for this cure and that, as men put it, to get this or that disease out of us, and it is for this that we visit the various watering-places. But that is not my view of the value of drinking waters.

Disease is too often so intimately a result of the inter-action of our several organs and structures that it is not to be got out unless its host is first broken on the wheel. The true meaning and pathology of uric acid, for example, will never be advanced by sending a man to a cure and telling him that the gravel he passes is a morbid material that is being washed out of him. Much nearer the truth would it be to say that it is made on the premises. Men go to these places in a condition of jaded vitality, and waters do not tend immediately to improve that condition; they may, indeed, and do, make them worse, as when, after a full course of waters, you end up, most disappointingly, with an attack of the very disease you have gone to rid yourself of. But it is all quite as it should be. The lethargic or choked organ, unladed and urged, necessarily turns out poor work, and the output, for the time being, gives evidence thereof. Nevertheless, it is a stage in the process of recuperation.

But when I go to "a cure," so called, I take no medicine save the water that I have come to drink, and the doctor has thus presented to him what is practically experiment after experiment, each carried out under, as nearly as possible, similar conditions; and the only things that come in to mar the accuracy of comparison are the attitude of the observer

and the individuality of the subject. These are important qualifications, I admit, but it is no small advantage to obtain even this simplification and chance of precision, so much more as it is the common lot of the practitioner in ordinary, who has his thousand and one drugs to select from, and the necessity laid upon him to change them, one after the other, when the ill-success of one and another, or the nerves of his patient, seem to demand it.

Thus the skilled balneologist who keeps himself alert would seem to have a magnificent opportunity for adding to our knowledge and benefiting mankind. He is, as it were, a picket planted at the outposts of health, to report the early movements between it and disease. Here are to be seen the ebb and flow of the tide of life; here, if anywhere, is the position to detect the early threatenings of morbid change; now, if at any time, is the moment to check the insidious advances of the invading enemy.

The balneologist's true work, then, as it seems to me, is to be a physiologist always—his study is physiology, not morbid anatomy; and therefore, at watering-places, if anywhere, should be gathered the most skilled and penetrating observation; here, if anywhere, should be the best-equipped laboratories; for are not all the varied eccentricities of function your concern?

Nothing must be allowed to escape us here. The air we breathe and exhale, the excretions of the skin, intestines, kidneys, liver, the expenditure of vital energy in every form, the supplies that are taken in for its renovation, all must be estimated in the most detailed way if any correct conclusions are to be drawn; and, if so, can there be any doubt that the borderland of disease needs the keenest eye, the most alert mind, the imagination curbed to scientific uses, and reared, too, not in the good, rich soil of striking new facts, but on the common, comparatively mean, things, if any such there be, in the economy of life.

And yet, although this is all true, although there are those in our midst who work ever in this mind and spirit, how little addition to our knowledge of physiology and medicine has,

as yet, come from any of these—our many should-be seats of learning. But the reasons for this are not far to seek and follow from what has gone before. In the first place, the public resorts to a water cure with a but half-serious purpose in many cases. Many never see a doctor while at the spa, and few come under any careful observation. Then the monotony of conditions again and again repeated tends, as one can readily understand, to envelop everyone in the shroud of treatment by routine. Nor is that all, for greater even than these is the inherent intricacy of the ground to be explored—that borderland upon the confines 'twixt health and disease where deranged function passes into disease. Oh! for the insight that might detect the passing! Have you any doubt about it? If I educate my brain in faulty methods of action; if impulsive, and I encourage its impulsiveness; or restless, and I play upon its restlessness; lethargic, and I give way to an excessive dormancy; I gradually create a bad habit, an unhealthy condition, that tends to increase until it is quite beyond my control, when it has become disease. May I give an illustration?

I have often thought that the disease we know as disseminated or insular sclerosis—of the origin of which we really know nothing—might conceivably start in those fits of dormant thought and suspense of will that are seen best in the hysterical woman, but which, in a lesser degree no doubt, have a very wide range of action in all conscious nervous action. I can readily imagine that, as in parts of the lung, suspended respiration, if sufficiently prolonged, will lead to collapse and then to induration, so areas of suspended action in the brain might eventually lead to atrophic and degenerative changes in those areas, and eventually to capillary and connective tissue changes, and these to the slow development of those curious nodules that characterize the disease. Thus it is conjecturally possible to trace it directly to functional inertia.

Such disorders of function in the case of the brain we call insanity, and we are not surprised when morbid anatomy detects no disease. But is it otherwise with other organs and

tissues? Of course not. The same law prevails everywhere—what man sows, that shall he reap. But we are so much more familiar with the changes worked by disease in those other parts that we even sometimes permit ourselves to argue from thence that there can be no error of function that is not preceded by structural change. But no physiologist can question that in stereotyped aberrancy of function lie the beginnings of such structural changes, and that, in its very earliest stage, structural change is either non-existent or so imperceptible and infinitesimal in degree that it might be righted in a moment. We may call the disease by any name we please, but it is the functional failure that is earliest appreciable in many cases, and little by little that failure bites out the engraving that we call disease.

It is easy to say, for the most part, when there is such coarse change as tuberculosis or cancer, or this, that, and the other that make up the rough morbid anatomy of disease, but what we have still to find out and to tell is, when a man is putting himself in the way of inviting these things to come; when function is becoming deranged and can yet be righted. We cannot cure a cancer or consumption—at least not yet, if ever—but we could cure even these, in all probability, if we could detect and alter the status that allows of their introduction. That is what open air does for tubercle. There is no cure for consumption when it has got a firm hold, but he who harbours it will make short work of it on its first introduction if his powers are such, and his environment such, that they make for health.

But it is just here that the doctor at a mineral spring elects to plant himself, and anyone can see how difficult is his position. A man may be at work for half a life and more, and find at the end, or more probably others will find for him, that he is off the line. Happy will he be if he can see that his energies have not been wasted, that even by the suggestiveness of his ill-success he has helped to establish others upon more productive ground and thus steered us all for the promised land. But not thus does the natural man view the treatment of disease; not thus even the doctor

himself when he comes to be sick, if we may, for the moment, distinguish between personal interest and scientific detachment. We put ourselves passively into the hands of our brother to be cured, as we call it, but our duty is a much more strenuous matter if the average value of watering-places of the health of the future is to be better than in the past, or what it might be. Co-operation—doctor and patient—must indeed be our watchword, but everyone will need to think more about, and know more about, himself; that is, how his machine is working, not introspectively and morbidly, but naturally, as a wise motorist knows his motor, to recognize that the machine, when out of order, “with its tricks and its manners,” must be helped to right itself, and the observer, by himself, has, from his own observation, in no small measure, to tell how the restoration comes.

And to show how true all this is, even one of the very latest approaches of scientific investigation towards the light—the opsonic dealing with disease—is in the direction of creating an aspiration or a want in the very lowest realms of our being towards this self-preservation and self-restoration. I know not what will be the final judgment upon the practical application of opsonic indices to the treatment of disease; I think that, as regards its present utility, it is not “quite quite,” as one lady said of another; but this, at any rate, will be, I think, always true, that the idea is a philosophical one in its conception, in that it is an attempt to eradicate disease by stimulating, under observation and control, what is supposed to be a natural physiological action. And one may venture to surmise that it is in this very direction that mineral waters and climate do their work. I doubt much if they wash out this and purge away that, or that their chemical action, if chemical it may be called, is of any such clumsy sort. Rather would I think of them as full of a nascent activity, calming and stimulating here, altering or disintegrating there, in that perfect transformation scene of imperceptible metabolism, which has ever been wrapped up in the mystery of living organisms, and has been, in all ages, the inspiration of discovery. Such inanimate influences as these have, as we now

know, boundless powers, as yet only on the threshold of recognition ; but immeasurable as they still seem to be, they are in all probability far below the possibilities foreshadowed in the energy of all animate existence.

Some, Sir, perhaps may be inclined to ask, What is the use of thus dreaming dreams ? I would, however, rather have it said that " Let there be light " embodies a good working ideal. It is no more than what this old world has worked up to through all its ages, since first it breathed into existence and throbbed with the impulses of organic life. And age after age in turn has surely given back the only possible verdict—"and there was light."

BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

THE DEVELOPMENT OF BRITISH HEALTH RESORTS (BOURNEMOUTH).

By GEORGE MAHOMED.

A GOOD deal of progress has been made during the last twenty years in the popularization of our health resorts. In spite, however, of powerful appeals from time to time in the lay press, of the efforts of our Society, and a growing desire to keep the money in the country, a large number of leisured invalids go abroad every year in the pursuit of health. This is not to be wondered at. A number of Continental spas owe their therapeutic advantages to past or present volcanic disturbances which we are fortunately without, to mountainous conformation which we have only in little, and to broad areas of sparsely populated forest which we no longer possess. But if we had equally active spas I should still prefer to visit a foreign resort for the sake of the novel surroundings, the change of human types, and the opportunity of leaving behind our papers, magazines, politics, tax-papers, bills, and worry generally, were it not for the fact that every time I go abroad I get ill. And this experience is not uncommon; there are three other medical men within a quarter of a mile of me who are affected in the same way. I asked Jones what sort of time he had at —. "Rotten bad," said he; "I was ill all the time, and in bed most of it!" I inquired of Brown how he enjoyed his holiday abroad. "Oh, very well, parts of it. I always get ill, and in Italy I thought—well, I have done it this time, I've got typhoid at last; however, I pushed on and came home all right." And these were medical men, who are not generally sybarites or valetudinarians. Nor are these ill-effects all due to bad sanitation; railway travelling in hot weather, differences in cooking and diet, and eating at unaccustomed hours are all contributory causes in my case. Nevertheless, if anyone suggested my going to Hastings, Brighton, Harrogate,

Torquay, Blackpool, or any other modern English watering-place as a holiday, I should view the prospect with alarm. Why? Well, the conditions of life there do not appeal to me. I suppose I am not gregarious. I do not like hotel life, boarding-house life is much worse, lodgings in towns are uncertain as to cooking and cleanliness. The best holidays I have had have been in village lodgings, farmhouses, or yachts. But even if I slept and fed in another star, descending to the watering-place to spend daylight hours only, I fear I should not look forward to them with much excitement. The attractions are the same—a parade, concert rooms, chars-à-bancs, the local theatre! I ought not to omit golf, though. Most pleasure towns have golf links nowadays, and that is a very great stand-by. But to set against the perennial freshness of studying a foreign people we want something more: one *needs a friend, and a hobby*. One can live a few days in a place without requiring them; a few years, and you find them; but a few weeks, and you become dull without them. That health resort will prosper that first goes back to our old friend the master of ceremonies, only he should be dubbed the director of public amusements. Such an official should be a person of position, cultured, and a sportsman. He would need an office, and £300 or £400 a year salary, and should attend the meetings of the governing body, with the right to speak (but not to vote?). One of his first objects would be to federate all clubs formed to cultivate sport or amusement; or at any rate to get into touch with all by the patronage, and if necessary, pecuniary support of the governing body; in exchange for which he would secure rights for short period members. The main difficulty that most clubs of this nature have to meet is rent and printing. An enlightened municipality should be able to lend rooms for the periodical meetings of clubs that only require such meetings, and rent rooms moderately to such as require permanent premises as chess clubs. All clubs in towns with a variable population require some advertisement, which should be procured in official guides and handbooks, and by public notices exposed in the places of resort, without cost to them. Many of my

confrères will know how difficult it is to get up a regatta in a seaside town. A meeting is called, and a sorry congregation of busybodies, tradesmen, publicans, and have-beens elects itself into a committee; the young men, either from slackness or modesty (we hope the latter), do not attend. Subscriptions are invited, a programme is arranged, prizes provided, and the estimated balance after paying for printing, rooms, committee boat, refreshments, are devoted to fireworks. Some sort of show takes place and there is a balance to the bad of £5 7s. 4d. How much better would this be under professional administration! The director would have attended meetings of the rowing and sailing clubs months before, he might have got friendly challenges sent to other clubs to compete. The preliminary bills would have been exhibited in the casino for weeks. He would address the railway companies from quite a different standpoint than the secretary of a scratch committee. As the day drew near, he would be able to announce that the council had put the whole of their resources, with certain guarantees, at the disposal of the committee—pier, the diver's boat, the lighter, ropes, bunting, marks, anchors, signalling board, band, everything that could contribute to success and save money being wasted. It is true in some towns the corporation do all this, but in others it is otherwise were it the rule, regattas, instead of being decadent, would be one of the best attractions of a health resort. And so with nearly every other amusement. At present a man whose hobby is photography arrives for his three weeks' holiday at a health resort; at the end of a few days he finds a chemist who gives him some help, and at the end of the second week directs him to the local camera club, poked away in a little room. He finds the secretary is away for a few days. At the end of his stay he learns he might have become a short period member if he had applied in time. Now if he had called at the director's office the morning after his arrival, he would have been told, "Yes, there is a camera club. I can make you a temporary member—2s. 6d. the subscription, I think. There is a dark room at your disposal. By the way, there is an excursion to the castle ruins on Saturday, with a small prize

for the best print obtained. The rooms are on the first floor of the casino, the second door on the right above the great staircase."

Another great benefit which the director would confer on seaside towns is the stage-management of official ceremonies. As a nation we are a long way behind the French and other Continental people in this sort of thing. We are too serious, and try too hard. I witnessed the opening of an electric light installation on the pier. When all had been said that could be said, a messenger was sent to the power station to tell them to light up. We waited. Would he ever get there? Had he got there, and was the current missing? Had there been an accident? At last the light flickered up and died down, flickered up and shone in all its dazzling, uncanny, ruthless accentuation of contours—previously only suspected. How much more effective if the speaker had the button of an ordinary electric bell in his hand; when he began his peroration, the first signal—be ready, and at the words "and there was light"—the glare.

I think many English towns fail to produce a really attractive guide. These works are usually full of reliable information about the place—statistics and figures of all sorts, and "pieces" written by the medical officer of health, the sanitary engineer, the educational authority, &c.—but they fail to engender a longing to go there and see the place. This is largely due to defective illustration. The usual plan, apparently, is to get a photographer to take some negatives and to print from these by the half-tone process. You get a view of the parade, photos of the principal buildings, churches, and institutions, and a photographic view from somebody's roof—showing hundreds of other roofs—and a principal business artery, as much of the town, in fact, as the lens will hold.

The merit of photography is that it is assumed to be correct. Certainly it does not err by making a spot look too attractive, but it is needlessly mechanical; atmospheric effects are lost, mystery, glamour, colour are not there. Some years ago I saw a number or two of a journal of which the chief feature was intentionally salacious illustration. There were pictures

of women tumbling head over heels, women in nightgowns, women bathing; but as the medium was photography, all suggestiveness was lost. Little squat, crude, ugly figures which were actually repellent. How different would have been the effect of a simple figure traced by a capable artist. It is the same with illustrations of towns or scenery. I have never seen any English guide that can compare, for instance, with that of the Mont Dore (Auvergne). It is published by the Publications artistiques de l'Album illustré des Villes d'Eaux et de Bains de Mer, 70, Rue Saint Lazare, Paris. Both backs of this little pamphlet are occupied by a reproduction in colour of Mont Dore in Roman times. In the foreground on the right is the pillared porch of a large building; in the centre, a pathway, an ox-cart, figures in graceful drapery; on the left, flowering trees and shrubs; in the mid-distance, the town with its temples and baths, reconstructed from the ruins discovered in the sixteenth century; in the background, the mountains. The whole picture is the work of M. Trinquier-Trianon. The pamphlet contains three other whole-page pictures by the same artist, all beautifully reproduced in colour and productive of a longing to compare them with the originals.

One would suppose that in every town that had any therapeutic claims to be a health resort, everything that could be done to advance those claims and render them accessible to visitors would be undertaken by the governing body. This has been done with signal success at Bath and Harrogate. Tunbridge Wells is moving, Brighton has begun to stir. Other places still sleep. At one of our most richly mineralized springs, tickets admitting to the wells, and the bottled water for home consumption, may be obtained at the grocers' ! At many large seaside towns the governing body offer no impediment to your breathing the air, and if you are strong enough to bathe in the sea you are graciously permitted to do so, and they of their goodness may provide a man in a boat at the bathing stations to aid if you are in danger of drowning. Now, if the only available sea-water bubbled out of a rock in Hungary, what trouble and expense people would put themselves to in

order to undergo the treatment that the municipal body there would place at their disposal. Delicate patients would be advised to begin with the hot pediluvium; then the compress; then to repose in the steam-heated water; the more robust would bathe in the water in a suitable bath and at suitable temperatures. Those suffering from chronic affections of the air passages would be ordered pulverizations of the ley; and possibly the strenuous would be subjected to ionizations of sea-water.

Thus much I had written before seeing Dr. Carpenter's paper and the discussion thereon, reported in the July number of the Journal. I regard it as a welcome reinforcement of the arguments I have addressed for a twelvemonth to our corporation. I agree with him that we ought to elucidate the therapy of sea-water. At present, scientific means of studying it are not available. Some points I have observed which were not particularly referred to in the discussion.

A hot sea bath is one of the best remedies for insomnia. The blood is drawn into the skin by the hot water and the action is prolonged by the salts contained in it. The water should not, therefore, be rubbed off the skin, but a warm towel should be folded over the patient, and sleep often ensues while he is in the cooling room; and, further, he sleeps better at night, the habit of wakefulness having been thus broken.

It is a peculiar and, to me, inexplicable phenomenon that while a robust, vigorous, hockey-playing young lady of my acquaintance shivers and has headache after sea-bathing—she is a fair swimmer—two married ladies who are of inferior physique altogether look forward to the bathing season and generally put on flesh and appear more vigorous. One of the latter had enlarged glands in childhood.

Fomentations of hot sea-water in one or two cases relieved the pain of joints enlarged during an attack of osteo-arthritis. There is no doubt that people who have been living an open-air life inland become bronzed when leading the same sort of life at the sea-side.

In drawing attention to some methods by which I think British health resorts might be made still more attractive, I

do not wish to minimize the great strides that have been made in recent years. One may say that on the whole English towns are very well ordered. Sanitation is good, streets well kept, buildings in good repair. Municipal corruption is unknown. In many towns the municipality provides music and sees that it is good ; lays out golf links, and encourages sports. Some illuminate public gardens from time to time. There is one point that we might learn from neighbours. I was told that in some South German towns when plans are submitted of new buildings it is not enough that they comply with the various by-laws enforced by the sanitary authorities, they must also conform to a certain æsthetic standard. That is, if an enterprising builder sends in plans of a terrace of stucco-fronted bandboxes that he proposes to erect in the middle of a town, they are referred back with "Provide a better facade" or some such direction on them. What a blessing such governance would have been to many towns in the days of their youth, in the days when the builders built at their own sweet will, and the architect was not.

Original Communications.

THE HEART DURING THE EARLY PERIOD OF CONVALESCENCE FROM ACUTE INFECTIOUS DISEASE.

By BEVERLEY ROBINSON, M.D.
NEW YORK CITY.

THE conditions of the heart, and its proper management in the early period of convalescence following acute infectious disease, is without doubt a subject of very great importance to every practitioner of medicine. Nor has the importance of this subject been ignored. In every special treatise on heart disease, and in every book on practice, some reference is made to it. I am obliged to remark, however, that frequently what is written or stated is insufficient by reason of the small amount of space that is allotted to its consideration, or because the rules for our guidance, which are laid down, are too general, and their lack of specific directions in given instances makes them relatively of little value. And yet, that the medical mind is certainly alive to the necessity of greater attention and care in behalf of convalescents is evident, as shown by an appeal made occasionally for funds to build a hospital for them, or insistence through letters to medical periodicals, speaking of the dearth and of the need of such institutions. Despite this, preventive medicine and the rules which should govern us intelligently, so as to ward off, or protect from, acute infectious disease, have received far more thought and work, it seems to me, than the care and treatment of those who leave sick beds where such diseases have previously prevailed.

I would not be understood as in any sense deprecating the well deserved labour given to the former by men of the broadest mind and most intelligent appreciation. All I would do is to contend forcibly for the judicious help and guidance of those who deserve, in my judgment, equal study and equal thought. It is, perhaps, Utopian—certainly in our life and

time—to hope to abolish entirely acute infectious disease. It is not Utopian, once the disease has occurred and been battled with successfully during the acute period, to contend daily and continually for a sufficient length of time against its normal or complicating sequela.

In this connection I take it that no organ of the body more frequently requires our wisest government than the heart. Upon prevention of cardiac dilatation depends mainly all future vigour and well-being in a very large number of instances. Not that we should ignore the other organs; not that we should not consider carefully the recuperation of the system in general; not that we should not pay strict attention to brain fag, to nervous exhaustion, to muscular debility, to powers of assimilation, to general nutrition. Granted all this, and yet the heart easily stands out primarily and most essential among all in the great majority of instances. This is notably true in typhoid fever, in diphtheria, in influenza, in pneumonia, and in scarlet fever. It is equally true, and even more so, in acute articular rheumatism. In the latter disease, however, the frequent accompaniments of cardiac degeneration or cardiac dilatation are so apt to be more or less pronounced endocarditis, or pericarditis, that we have a problem which is somewhat unlike that connected with the other acute infectious diseases referred to.

In what follows, in view of limited time, I shall be obliged to omit many facts and details of very great interest, and confine myself as closely as possible to some salient cardiac features which are more or less common to the diseases mentioned. In all of them the heart muscle and the nerves governing heart action are, as a rule, affected organically, if the disease be at all severe and if it lasts its usual period. By reason of the divers toxic elements of each one of these diseases, more or less cloudy change and fatty degeneration, as well of heart muscle as of nerve-fibre, may be found. Numerous small lymphoid cells are often shown in the interstices of the muscle fascicles. The separate muscle cells are swollen, and often the nuclei have disappeared. The muscle cell shows granular or fatty degeneration, and the striæ are

less well marked. The muscular fibres are sometimes ruptured. The degeneration may be general throughout the heart, or limited and more pronounced in certain areas, and the rest of the heart be comparatively intact so far as is observed microscopically. Sometimes, and at a late period of the acute stage of disease, the heart muscle has become hyaline, or even fibrous in certain portions. Fatty infiltration of the cardiac nerves and cloudiness of nerve sheath and irregularity of the cylinder axis are not infrequently noticed at autopsies. The heart is flaccid, the walls thin, or there may be occasional hypertrophic dilatation. The colour varies from the sear and yellow leaf hue to a reddish-brown colour. The heart in both instances is easily torn. Endocarditis and pericarditis are rare, at least of pronounced degree. There may be a slight endocarditis of the cardiac walls, which has not extended to the valves, or there may be a little beading of the free margin of the mitral valve which has not gone further and may, and usually does, disappear with time. Cardiac thrombi are often found, especially in the right heart which is distended. These thrombi may be soft, gelatinous; frequently in diphtheria and pneumonia they are fibrinous in great part and formed probably some hours, or days, previous to death.

In making autopsies after acute infectious disease, it is essential not to confound pathological lesions due to other and preceding causes with those due to the infectious disease we are investigating. This is especially true of the lesions of a pre-existing myocarditis, subacute or chronic, which might be mistaken for those due to the immediately previous infectious disease, unless we are very careful and rigid in our examination and interpretation of what we find. And even when we are most painstaking, there are conditions at times, so far as the heart is concerned, almost on the border-line, and we cannot say precisely what has occasioned them. In those instances, particularly where the *post-mortem* findings have to do with scarlet fever which has been complicated during life with marked rheumatic manifestations, or those of suppurative arthritis; the evident lesions of endocarditis, simple or ulcerative, or pericarditis, dry, serous, or suppurative, will surely indicate the complicating dyscrasia.

From these considerations it is shown that at times the pathological lesions of the heart are various, and nerves, muscle, vessels, are more or less affected, and in a more or less advanced degree of pathological change, due to a combination of causes. Hence our affirmations as to what is, and what is not, caused by the previous acute infectious disease must be made guardedly. It is, however, highly probable in a given instance, and where the acute infectious disease has been grave, or prolonged, that myocarditis, relatively acute, is thus occasioned, and not by some doubtful cause acting a length of time previously and little by little.

One of the most obscure and unsatisfactory findings up to date is what relates to cardiac reports in autopsies following influenza. Frequently, if not always, we are in great doubt as to what is the result of influenza and what is due to previous or complicating disease. Moreover, about the correct diagnosis of the influenza we are often in great doubt. The "bacillus," which is regarded as characteristic of the disease by some physicians, to others is of doubtful value, and to them does not establish the identity of the disease. Many cases of so-called "grippe" are not "grippe" at all. They are simply cases of ordinary tonsillitis, pharyngitis, bronchitis, otitis.

In those instances of heart weakness, or sudden death following acute infectious disease, we frequently assume that the cardiac muscle is degenerated, or indeed, at the autopsy, we find the evidence of it to the eye and to the microscope. On the other hand, while we may find *post mortem* evident cardiac dilatation, there are present, properly speaking, no organic changes in the heart. Now, then, while we attribute heart failure to degeneration of muscular or nerve fibre when it exists, what do we say in those cases where both muscle and nerves reveal nothing abnormal? It seems to me, we must at least admit ignorance on our part as to what is the real cause of cardiac weakness at times, since muscular or nervous degeneration would only explain cases where it exists.

The cardiac thrombi often contain the bacilli of the disease and are a distinct menace to life, not only by reason of their

mechanical transport, but also because of the metastatic abscesses which they give rise to in different structures and organs.

Such changes, briefly, are what we find at autopsies in these diseases. It is fair to assume that during life, in minor degree at least, similar pathological conditions exist even after the acute stages of the disease are passed and the patient has entered into what may be fairly termed the early convalescent period. This period is considered to be that during which temperature has again returned to the normal, pulse is approximating the health standard, appetite is returning, and increased strength and vitality more evident. The patients begin to express the desire to sit up, to get out of bed. A little later, and after being out of bed for a few hours each day, they wish to go out of the room, or downstairs, and later still to go out of the house for a drive or short walk. When is the proper time for permission to do these things, and upon what symptoms or signs should our judgment be based?—and especially so far as the heart is concerned—the most important of all the organs in this determination, as a rule. From my own observation, study, experience, I would specially emphasize the importance of what follows, as a guide, in a measure, of sane conduct in a given case.

In typhoid fever, I do not believe, as a rule, it is wisdom for the patient to sit up in bed even for a short time, for several days—usually a week or ten days—after the temperature has reached the normal. I do not think that he should leave his bed until he has sat up in bed several times at least, and finally without causing any very considerable changes in his heart action and in his pulse. If sitting up in bed causes much increased rapidity of pulse, with irregularity and occasional intermittences, it is indicated to go slowly and make the sitting up very little, or not at all, for awhile. If combined with these indications from the pulse there is a soft blowing systolic mitral murmur at the heart covering the first sound, and combined with, or not, accentuation of the pulmonic second sound—if, without any mitral murmur, there is notable weakening and lack of tone to first sound—and if with, or

without murmur, the heart action is feeble, rapid, irregular, and now and then intermittent, I should deem the patient safer flat on his back than even sitting up in bed.

What is stated as regards sitting up in bed is true, again, when the patient has been permitted to get out of bed, to walk into an adjoining room, or to go downstairs. Of course, we should expect the first time the patient sits up in bed, or gets out of bed, increased rapidity of pulse, and frequently a blowing systolic murmur indicative of mitral inadequacy. But in a day or two, or a few days at most, the pulse should be less rapid, and while the blowing murmur may be still present, the heart action is more forcible and the pulse less depressible. Again, if we take the blood-pressure with Janeway's sphygmomanometer, there ought to be relatively moderate differences between what is noticed while still in dorsal decubitus or sitting upright in or out of bed. Otherwise, we wisely cry a halt to any exertion at all—physical or mental. If the temperature, instead of being normal, is subnormal—down to 97° to $97\frac{1}{2}^{\circ}$ F., I object to a patient leaving bed as a rule. If, with lowered temperature, the urine is also of markedly low specific gravity (1000 to 1010), and when we know it was normal in health, and had kept a good specific gravity during the acute period of the disease, and if its quantity is lessened, or not at all increased, I most strongly object to a patient getting out of bed or, at all events, walking from one room to another. Subnormal temperature, with urine of low specific gravity and lessened quantity, and perhaps slightly albuminous, added to increased rapidity of heart action and pulse, and lowered force of both (with, or without mitral murmur), and with, or without notable irregularity or intermittence of both heart and pulse, means inadequate heart strength. When instead of increased rapidity of pulse and heart we get notable slowness of both, I am even more solicitous and careful of my patient, and dread more the advent of sudden heart failure. I have seen this come on after very slight exertion in both conditions, and be ushered in with sudden faintness and great pallor; or again, the lips and finger-tips were notably blue and cold. With these signs

the patient had marked dyspnoea and a sense of "goneness." By means of immediate stimulation, such states are usually recovered from rapidly, with only the passing fright remaining, to remind one still to be very careful and watchful for some time to come. Later, and when patient had been out to walk or to drive, and apparently seemed fairly well and strong, all of a sudden such an attack as that just described would occur, and frequently without any evident cause. Again, some slight over-exertion would be the obvious accidental cause.

Following attacks of the sort described, I have examined the heart carefully. Sometimes I have been convinced by physical exploration, notably by percussion and palpation, that the heart was dilated and that this dilatation was seemingly acute in nature. Again, while I believe such dilatation was present, it was difficult, even almost impossible, to demonstrate it. Behind this dilatation, when present, we should see cardiac muscular fibres and cardiac nerves which are still suffering, as a rule, from structural disease, in the way of cure, but not yet recovered. Are these cases due to both systems being affected—the muscular and the nervous—or may we separate them? Occasionally I have thought I could. When I have seen a patient get out of bed, go down stairs, or go out and drive or walk, and return to bed later, and feel better and stronger for the exertion, and show it by higher specific gravity of urine, normal temperature, even slight increase of it (99° to $99\frac{1}{2}^{\circ}$ F. under tongue), increased blood-pressure and stronger and more regular pulse, I have been convinced that the cardiac nervous system and not cardiac muscle might be at fault, functionally or organically. The soft blowing mitral systolic murmur may exist for many weeks.

Finally, and when the other cardiac signs and symptoms were practically all right during the convalescent period, I have come to the conclusion that the murmur was due not to mitral regurgitation through lack of closure of orifice caused by want of cardiac power, but to improper or badly co-ordinated nervous control of cardiac systole. I have been of this opinion, and it has been strengthened when the patient found that if he used his mental faculties, except in very

moderate degree, both his eyes and brain were sensibly fatigued.

Of course, to anyone recovering from typhoid fever particularly, and who has fallen a victim to the disease when his previous life had been pre-eminently an intellectual one (lawyer, clergyman, scientist, &c.), it is specially desirable during convalescence to avoid or limit continuous mental effort. The powers of the mind come back slowly, and in my observation among the last, and I do not believe that the heart itself will often work absolutely well unless the cerebrum be also healthy, structurally and functionally.

Is there any period of duration, as to the possibility of fainting attacks during convalescence, as to the development of more or less cardiac inadequacy due to dilatation and caused immediately by muscular or nervous cardiac changes? In general terms there is not. It may last weeks, months, years. Such cases must be managed with the greatest care, watchfulness, knowledge, patience. Time alone, with proper hygienic conditions of pure air, pure food, proper rest, recreation, and many hours of sleep in the twenty-four, will bring the patient out as well as ever. Drugs may be used beneficially in proper amounts during the acute attacks, and of these none is so valuable as *strophanthus* by the mouth, or hypodermically, and followed immediately with best brandy, whiskey, or ammonia. Subsequently, strychnine is useful in certain cases, coca in others, and *digitalis* also in a few instances, in small or moderate doses, especially the infusion made from fresh English leaves.

Personally, I have never tried the Nauheim treatment, natural or artificial, in the early convalescence from acute infectious disease. It has, however, been vaunted, by one physician at least, even in the acute stage of typhoid fever, and later in a convalescent patient from this disease with an extremely weak heart. A modified artificial Nauheim treatment called¹ the siphon method by Albert Abrams, has demonstrated its favourable action by giving the pulse increased

¹ *The Medical News*, March 16, 1901.

strength in such an one. I am very glad to report, also, that our fellow-member, Dr. Philip King Brown, of San Francisco,¹ has made use of the Nauheim bath treatment in several cases of pneumonia and typhoid fever at their acute stages, and speaks favourably of the results obtained from them, especially in pneumonia, as compared with those effected by drug stimulation. The average blood-pressure was notably "higher and better sustained on the early days that baths were given than on the days that drugs were given." It would be fair, therefore, to assume from this that we should obtain as satisfactory and even better results from the use of the Nauheim baths in the early convalescent period, but of this I have no experience, nor can I record that of others. It is for the future to decide.

In the later convalescent period of certain cases of influenza and typhoid fever, particularly when the heart remains weak and slightly dilated, I am confident that the Nauheim treatment, wisely given by experts, is often of unquestionable and great value.

In instances of sudden heart failure, occurring during the early convalescence of acute infectious disease, suprarenalin or adrenalin by the mouth in tablet triturates, each containing gr. $\frac{1}{10}$, or preferably in hypodermic solution of 1 in 1,000, is unquestionably very useful, as has been frequently observed. Personally, however, I have learned to place great reliance upon tincture of strophanthus by mouth and hypodermically, and I do not feel like abandoning it at present for the newer drug, until I am satisfied it is more advantageous under like circumstances. In view of the fact that strophanthus acts almost wholly as a very rapid and efficient heart stimulant, whereas adrenalin acts almost as much in contracting small peripheral blood-vessels and thus raising vascular tone, as it does in giving power to the heart itself, this double action, it seems to me, might be prejudicial instead of beneficial in those cases where there is no vaso-motor paralysis, and which do not require the heart to be stimulated by increased functional vascular power.

¹ *American Medicine*, September, 1906, No. 6, pp. 325-331; also *Trans. Amer. Climat. Assn.*, 1906, p. 108.

Finally, I cannot emphasize too strongly the major importance as a remedial agent of *rest*. This rest must be absolute in extreme cases and frequently prolonged many days and many weeks. After typhoid fever, pneumonia, diphtheria, influenza, scarlet fever, it is important, as already noted, but after an attack of acute articular rheumatism, in which the infectious nature of the disease is now certain, although the special microbe causing it is not yet universally accepted, it is the *sine quâ non* of prophylactic treatment and of that of the disease. And why? Simply because without it the numerous cardiac lesions will inevitably occur, which fill our hospitals and our dispensaries, and which are then usually hopeless, so far as cure is concerned, and frequently most distressing cases. Among the results of acute articular rheumatism, neglectfully or foolishly treated, cardiac dilatation accompanying and caused by chronic myocarditis is by far the worst sequela we could have. Of course it may be, and frequently is, accompanied by and aggravated with chronic valvular disease, but it is the chronic myocarditis and not the valvular disease *per se* which makes the outlook to the patient and to the physician most deplorable. All this, many, many times, may be prevented in great part, if not entirely, by rest, rest, rest. Rest for the body, as for the mind; rest, absolute and continuous for days and for weeks. I am very glad to add that nowhere is this absolutely essential treatment insisted upon with more force and ability than in a paper read before the American Medical Association last June, by Dr. S. S. Cohen, of Philadelphia.

Great or even moderate mental strain should be avoided during several months at least; the same is true of severe, continued bodily exertion. Either one or the other may occasion cardiac dilatation little by little or suddenly. In either case, the condition is often irremediable and sets up heart disease which will last as long as life lasts and usually gets continuously or intermittently worse, though it may be held stationary at times and for a while. To the neglected or careless and ignorant management of the early convalescent period following acute infectious disease is due, in my

judgment, the larger proportion of chronic cardiac disorders of most distressing, disabling, and finally fatal character, from which youth and adult life suffer.

The immediate risk to life is probably greater in the convalescent period of diphtheria than it is in the other acute infectious diseases, and more than one sad, deplorable event has occurred in my experience. Not always do deaths follow when there has been ignorance or negligence. Despite all judicious care and proper management, unfortunately, they occasionally occur, and moreover when practically, during days or weeks, there had been no warning note or previous threatening symptom. Sudden cardiac paralysis occurred and the end came, rapid almost as the lightning stroke. Again, there had been a slow, gradual asthenia, which nothing seemed to conquer and which in final paralysis, and allied with other paralytic symptoms, seemed to be evidence of extensive cardiac degeneration of muscle and nerves.

In scarlet fever the complicating nephritis of the third or fourth week of the disease throws additional strain upon an already weakened heart, and thus *dilatation*, or hypertrophy, with dilatation, is occasioned. Whenever in addition to the nephritis of scarlet fever during the early convalescent period we have also marked rheumatic manifestations, we should be fearful lest endocarditis or pericarditis should endanger the heart already weakened and dilated. To guard this heart effectually, we should make use of the ice-bag or hot water bag to the præcordial region and give salicin internally in moderate or large doses.

In croupous pneumonia, as I have shown previously more than once, we should guard our patients specially against blood-clotting, which is prone to occur, more so than in any other acute infectious disease with which I am familiar. This we may do effectually by means of carbonate of ammonia judiciously given, or by means of citric acid, agreeably administered as lemonade. As to the poison of gripe, I have no special counsel to give other than to state that I believe a moderate amount of quinine—or better still cinchona bark, in the form of the compound tincture—is

valuable as a general tonic, and possibly has special value as a cardiac protection against dilatation. Certain it is that we cannot be too careful in the management of the early period of convalescence following *la grippe*. How often do we see or read of patients who have apparently recovered from the acute attack of the disease, are without fever, appetite and strength partially recovered, who have a sudden relapse. They go out of the house, expose themselves to the weather, return to their accustomed pursuits, and for a few days or weeks, seemingly, they are improving continuously and indeed almost well; and then, sometimes without obvious cause, sometimes as the immediate consequence, apparently, of mental or bodily strain, they become re-infected with the poison of the disease and are soon weak and prostrate again, and more so than during the original attack. In these instances sudden death occasionally occurs. Now, whether it be the threatening and weakened condition of the patient from the renewed grippal attack which alarms us, or whether it be the sudden death thus occasioned which shocks us, we may be sure that it is the weakened, structurally altered heart, or profoundly disturbed, functionally deranged central organ, which is the principal agent, or precursor of long, painful invalidism, or sudden fatal termination.

The prognosis of a given case during the early convalescent period must depend very much upon the previous health of the patient and especially upon the previous condition of his heart. If the patient be young and hitherto well, the prognosis is usually fairly good, even though the infectious disease has been of severe type—excluding untoward accident or complication. On the other hand, if the patient be near or past middle life, we should be more anxious. And this is true especially of pneumonia and influenza more than of typhoid fever and diphtheria, mainly because the two former diseases attack these ages more frequently than the other two. But in any particular case we are specially anxious, either because, knowing the previous history, we believe it possible or probable that there had been already a pre-existing myocarditis before the attack of the infectious

disease, or because we know positively this condition, with or without valvular disease of the heart, *had* pre-existed. Under these latter circumstances, the prognosis is notably graver, and frequently, as we know both in pneumonia and influenza, the patient dies rapidly or suddenly during the early convalescent period, and the death is undoubtedly caused directly by cardiac degeneration.

As to any special drugs other than those I have mentioned being useful to shorten the infectious disease or ward off irretrievable disaster, I know of none except what are usually termed tonics. Of these, iron in some form is occasionally useful when there is evident anæmia during the early convalescent period after infectious disease—caused or not by it. Incidentally, the iron may strengthen the weakened heart to resist dilatation, if not already present, to lessen it possibly, or prevent its increase, if it has already developed.

Finally, I would insist that when we consider that apart from rheumatism, syphilis, alcoholism, continued bodily strain, with poor food and hygiene—*cardiac dilatation*, acute or slowly developed, is mainly occasioned by ignorant, injudicious, careless treatment of the early convalescent period following acute infectious disease, we must recognize the immense importance of my subject to every practitioner of medicine. Inasmuch as I believe cardiac dilatation is a preventible disease in these instances, its importance is only still greater.

THE HEART AND ITS DANGER IN THE TREATMENT OF OBESITY.

BY ROLAND C. CURTIN, M.D.

PHILADELPHIA.

ABOUT fifteen years ago, at the time of the advent of fashionable breakfasts, dinners, teas, luncheons, kettle-drums, &c., our ladies especially became interested in these fads, and became so engrossed in their attendance upon them that they sometimes made a business of such visitations. One woman told me that she had attended eight such functions in one day. This habit of feeding upon tempting and rich viands frequently caused considerable increase in weight, and this, coupled with the indolent apartment house life which came into vogue about the same time, caused an unnatural taking on of flesh. Later on there was a disposition to get rid of the flesh so gained, a desire to return to the "willowy form." A *kind friend* of one of these fat, pallid, sleek, round, slowly moving women said "she looked and acted like a big, fat chestnut worm."

After these conditions had been going on for some time, I was called in quick succession by three physicians in consultation in as many cases of women of advanced years who were in the last extremity of heart weakness, as shown by dropsy, orthopnoea, &c. They all promptly died. I found upon investigation that they had been reducing their weight by anti-fat medicines and a very restricted diet. They were aged 48, 53, and 62 years. One of the three women used a preparation of phytolacca together with a very close diet; another used phytolacca in combination with a restricted diet, and some other unknown proprietary medicine; and the third used a proprietary remedy which was not known to anyone, probably phytolacca. Shortly afterwards two more cases with the same history came under my observation with symptoms such as great weakness, especially of the heart; and other physicians informed me that they had seen cases tallying with those that I herein report.

Since that time I have had knowledge of other cases. I have noted the history of some of these later cases, with the results, and will make a brief report on the subject of the effects of ill-judged treatment of obesity.

Cases 1, 2, and 3 were the first fatal cases that came under my observation which have been referred to.

CASE 4.—Mrs. F., a lady aged about 35, the mother of six children; her weight was 210 lb. She took saline laxatives and thyroid extract tablets, grains 5, to cause a reduction. She rapidly lost 26 lb. Her health began to give way, and she became very weak. Her breath became very short, and she could not sleep, and was asthmatic at night (probably cardiac). Her heart palpitated annoyingly. The treatment was interrupted, and she speedily lost all the foregoing symptoms.

CASE 5.—Mrs. B. W., a rather large-bodied and full-blooded lady, was treated by a Philadelphia doctor who has a reputation for relieving women of their superfluous flesh. She took salines and some thyroid tablets. After being under treatment for a short time she became neurasthenic (highly nervous), was excessively weak, and had palpitation of the heart; sleep was almost banished. All these symptoms disappeared upon stopping the treatment.

CASE 6.—A Chicago man, a German, weighing 225 lb., took the juice of five or six lemons each evening and walked many miles each day. He lost 30 lb. in the week. Then followed weakness and heart trouble and generally ill-health. The heart was greatly disturbed, and finally became "dilated." A "pernicious anæmia" set in, and he died at the age of 54.

CASE 7.—Mrs. S. M., aged 45. This married woman went under a medical treatment for excessive adipose tissue, taking unknown medicine and dieting. She hurried matters and lost weight rapidly, quite enough to please her; but soon she had a sudden heart failure, and promptly died.

CASE 8.—H. C. This patient stopped bearing children at the age of 36, began to get fat, and resorted to medical treatment. She lost flesh; was so relieved that she became rash, and soon became sallow, losing all her previous

freshness, and became breathless, so that she could scarcely ascend to the second floor, on account of palpitation and dyspnoea. The return to health was rapid upon giving up the treatment.

CASE 9.—Colonel H. At 64 years this man took Delsarte movements for abdominal obesity, and reduced himself quite 2 in. He was very enthusiastic, and went at it unusually hard. The heart became fluttering and intermittent, and continued so for three weeks. He became “easily winded,” weak, and pale. He complained of a feeling as if water was running up the back of his neck and occiput. The heart sounds were very feeble. He recovered slowly.

CASE 10.—A doctor's wife, a patient of Dr. B. F. Stahl, of Philadelphia, who sent me the history of the case. “She was about 30 years of age, short and stout. She had had valvular disease of the heart, which was well compensated before she disregarded her husband's advice and took Swedish movements under a woman who was skilled in this work ; but, as is so often the case, in her ambition to get speedy results, she took twice the number of movements recommended by the woman. Unknown to her husband and nurse, she took some “French pills,” to expedite the coming of the new form. At the end of about three weeks she had symptoms of acute dilatation of the heart. I have never heard a heart with the muscular sounds so deficient. The action of this organ was very feeble, and her convalescence extended over three months, after which she promptly regained the flesh she had lost. This case furnishes a striking example of the risks taken by those who try to reduce their flesh without having a competent physician carefully and frequently to estimate the competency and sufficiency of the circulatory and excretory viscera.”

Some of these cases would have passed as cases of senile heart had I not enquired particularly about the previous history of the patient and family, the latter furnishing most of the information.

THE HEART AND SOME OF THE ASSOCIATED SYMPTOMS
IN THE CASES.

In all the cases here noted there was weakness of the heart. In two cases, Nos. 6 and 10, it was called "dilatation." In one of these cases the subsequent cause of the symptoms would seem to rather throw a doubt on the diagnosis. I firmly believe that in all the cases that I had an opportunity to observe the weakness seemed to be in the heart muscle, for in the two younger patients the recovery was rapid and in keeping with the increase of the general muscular strength. The heart sounds were feeble all over the præcordia and the area of dulness was apparently normal. The apex beat was in the normal position but very faint. It seems to me that if the general muscular system is weakened by starvation or otherwise, the heart muscle must also suffer. The proof that its symptoms were not due to the influence of the remedies used is shown by the fact that the same symptoms were found in cases that took phytolacca and thyroid extract or salines as well as the other remedies used including diet and exercise; they all were affected with the same cardiac symptoms. The older persons who had in all human probability some degeneration of the heart-muscle, fatty or myocardial, could not recover owing to the known weakness of the muscular walls, in some cases probably because of the resulting associated conditions.

TABULATION OF THE SYMPTOMS IN THE TEN
CASES REPORTED.

- (1) The heart sounds were weak in all the cases.
- (2) General weakness in the ten cases.
- (3) Organic heart disease: five had symptoms of degenerative heart muscles, and one had valvular disease.
- (4) Simple irregularity or intermittency or both in five cases.
- (5) Marked palpitation in three cases.
- (6) Neurasthenia in five cases.
- (7) Insomnia in seven cases, not noted in three.
- (8) Asthmatic symptoms in one case.
- (9) Breathlessness noted in six cases.

(10) Death in five cases, all of whom were advanced in years, the youngest being 46. One died quite suddenly.

In order to understand the causes of the disturbance in the heart, it will be necessary to study the factors at work in the production of the symptoms given ; this involves the study of the different forms of treatment for obesity.

First, we should study the cause of the obesity. We are not all made alike. As has been stated, some persons belong to families that are naturally prone to obesity, others to thinness. Shakespeare might have said with truth that some are born fat, some achieve fat, and some have fat thrust upon them. Too much food ingested, especially that which tends to produce a fatty condition, when associated with scanty elimination. An inactive life, and the avoidance of maternity in the married ; too much sleep together with an excess of water, alcohol, and malt are potent fat producers. Sugar and starches, I may also mention, but any kind of food in excess may furnish the material for obesity.

It has been known from time immemorial that the fat person might be reduced in weight by various simple devices. The jockey was reduced in weight so as to be able to ride a certain horse ; the pugilist was made to train down in order to be in a class for which his natural weight unfitted him ; and in the ancient times—the time of the iron-cased knight—the big boy was reduced so that he would fit his father's armour. The reduction was accomplished in those times by abstinence from food, and by prolonged and active exercise at the same time, the exercise being vigorous enough to be accompanied by profuse sweating. Later on, other fads for reducing fat came into play—some quite novel, and all more or less efficient.

I have heard of many interesting methods of reducing flesh. A major of a cavalry regiment was so fat that it took two men to put him into the saddle. Knowing that he would soon be retired for incapacity to attend to his duties, he applied to his surgeon for advice, who told him that he might select *any one article* of diet and use it exclusively without stint at his three meals, and nothing else in the way of food. In six weeks he lost 40 lb. and could throw himself into his

saddle without difficulty. Another method mentioned was to eat any one article at a meal, changing the article at every meal, if desired. Still another way was to eat only one unrestricted meal each day. Some only restricted the amount of drinking water, thereby robbing the blood and the tissues of fluid. Again, a reduction in the amount of sleep was in some cases recommended. Then we had certain articles of food cut out of the person's diet, the carbonaceous or the amylaceous, or both. When such persons, usually hearty eaters, were recommended to exercise more and eat less, it usually ended in their exercising less and eating more, the attempt finally resulting in an obnoxious increase in weight. Finally, they wanted to get thin without dieting or exercising, so they took kindly to medicine that would do the work without so much self-denial, hence the popularity of medicinal treatment. The tendency to overdo the matter was the cause of the danger and trouble.

Banting, Oertel, Ebstein, Hirschfeldt, Bruen, Fleming, and others recommended their own plan for reducing the fat. Even at an earlier time we find that Hippocrates and Galen advocated a treatment for obesity.

Generally speaking, if a woman waxes fat she wants to get thin, and if she is thin she wants to become fat, so that nearly one-half the dissatisfied female population wants to be fatter, and the other half wants to be thinner. One woman told me that she did not want to be a freak or a fright, neither too fat nor too thin.

For example, the healthy young bride from the country is placed in an apartment house. After a life of activity and outdoor life she now leads the usual life of indoor idleness; eats more, especially of rich foods; goes out to luncheons, &c., and partakes of luscious and fattening foods. She has no babies; if she does have them she does not nurse them. She soon develops an obese condition, and probably later some form of dyspepsia. This woman, feeling half sick and finding that her dresses are getting too small, probably rushes out to a drug-store or a doctor to be reduced. She weighs herself a week after commencing the treatment and finds that she is losing a

pound or two daily. She starves herself more, and takes more of her medicine, to hasten the "Greek slave form" that she is after; but, alas! she begins feeling badly, and then sick, stops treatment, and probably finally recovers because she is young. One experience is enough generally; personally, I never knew of anyone who tried it a second time. Such women usually do anything in the way of exercise that is not useful. They leave their usual matronly duties at home and go to a gymnasium or a sanatorium to get the necessary but unproductive exercise, avoiding such active duties as our grandmothers used at home.

The fat on people is often hereditary, and in these cases any interference with it is meddlesome, and is likely to be more or less injurious; for the treatment must be vigorous and sometimes harsh to effect a marked and rapid reduction. These cases are, therefore, attended with more or less danger to health and even life in some cases.

TREATMENT OF OBESITY.

Treatment by diet is a very important element in the treatment of obesity. Less food causes a starvation of the more solid tissues as well as the blood. This dieting may be by the quality or quantity of the food taken, the drinking of fluids may be curtailed, which dries up the tissues, reduces the bulk of the blood and consequently the fluidity, thereby diminishing its carrying power.

Treatment by exercise, such as walking, running, climbing, rowing, gymnastics of various kinds, horse-back or bicycle riding. These exercises when continued are active enough to help to use up the nourishment taken, and the consequent perspiration hastens the elimination of the waste products in the body. This plan of treatment is rarely carried out by the lazy, fat person; he prefers an easier way to reduce the fat, being disinclined to use exertion. Exercise causes the fat to change into muscle, and dissolves the disintegrating cells and eliminates them.

Phytolacca has been long used as a remedy for rheumatism and diphtheria. It was found to produce a reduction in the

fatty tissue when used in these diseases. In some of the rural parts of the United States the phytolacca berries are even now eaten to reduce flesh. We are told that it is a very efficacious remedy. Almost all of the cases with heart trouble that I have been cognizant of have used this drug, but then we must remember that the only treatment apart from diet consisted of the use of this drug. How does phytolacca act? The writers of *materia medica* tell us that it is an emetic, a purgative when used in full doses, and later a narcotic, at the same time causing great prostration, the heart depression following the general weakness not preceding it.

Saline Treatment.—This form of treatment acts largely in working out the waste products in the tissues by use of the kidneys, skin, and bowels. The alimentary canal is washed out and the food hurried along the alimentary tract retarding the ingress of nutriment, thus robbing the tissues. Saline laxation used to be called "white bleedings" because it impoverished the blood without loss of red corpuscles. Almost any laxative saline will answer the purpose for this treatment. They all contain mineral salts which are the active agents and bring laxation, they wash out the emunctories and intestinal canal, the kidneys, and the skin. Kissengen and Vichy are generally used, first because they are cheap, and secondly they are easily procured. You can use the artificial or natural water—I have used a mixture of Pluto water and salirtæ powder night and morning with good effect. The usual rule in using the saline is to take a glassful of Kissengen or some other saline water half an hour after each meal on one day, and on the next, a glassful of Vichy at the same times, alternating these salines daily thereafter, in increasing or decreasing quantities.

Thyroid extract is a comparatively recent addition to the remedies used in the treatment of obesity. It was used as a remedy in various diseases, especially the thyroid gland. It was then found that patients lost weight while using it; therefore it was reasoned that it would be good in the treatment of obesity. Mr. Van Leichenstein and Wonderstadt, physicians to the Augusta Hospital at Cologne, found that

in twenty-two cases out of twenty-five the patients decreased in weight. The decrease was quite rapid at first. Thyroidin was later used by injection in animals with the same results. After a period of time further reduction ceases. It is very satisfactory in some cases ; in others it is disappointing. We are cautioned against its long-continued use, or its use in too large doses, on account of untoward results. I have used it extensively in cases with enlarged thyroids, especially in Graves' disease, sometimes for a year or more, and in doses, 3 grains three times a day, without any untoward results. In some cases reported it seems to have produced symptoms such as headache, stomach derangement with nausea, and intestinal disturbance. It is well to be on your guard in face of the testimony of some authors. The heart has been disturbed according to some writers. Those cases which have symptoms of myxedema are the most benefited by its use. In all of my experience I have never known a weak heart to follow the use of thyroid extract.

Less sleep is sometimes ordered, cutting out daylight naps, which is quite effective. Short sleeping hours will in itself reduce flesh.

Malt and alcoholic liquors are interdicted. These are the most important remedies used in reducing excessive obesity. There are other means, but not so important as those mentioned. Bromine, iodine, mercury, arsenic, guaiacal purgatives, sour wines, baths, sweating, a fish diet, lemon juice—all have some reputation as anti-fat remedies. You will observe that none of these remedies have much influence upon the heart, even when taken in excess, and you will notice that the same condition seems to come from different causes. Cases 1, 2, and probably 3 and 10, took phytolacca and dieted closely. Cases 4, 5, and 8 took thyroid or saline, also dieting, but not very rigidly. Case 6 dieted and took lemon juice and exercised to excess, and Cases 9 and 10 dieted and exercised to excess. Some of the ten dieted in an unreasonable way, but three did not alter their food either in quality or quantity. And yet they all had symptoms more or less in common. We are forced to the following conclusion :—

we must be careful in our treatment of the obese, not to disturb the muscular tissue, weaken the nervous system, or change the blood too much ; but simply and slowly reduce the fat, or we may run into serious danger. The treatment in the aged, weak, or one with organic disease of the heart, should be carried on under the eye of a physician, preferably in a sanatorium. If you disturb the nutrition of the heart muscle in such cases you may have fatal results ; and even in the strong if it is not dangerous to life, it may be to health, as in Case No. 6. In valvular disease of the heart you may cause a dangerous incompetency. Beside valvular disease we should carefully avoid tampering with cases that have a fatty heart, a dilated heart, or myocarditis.

Among the rules laid down by von Noorden we find the following : When the heart is weak do not use strong laxatives. Use small quantities of liquids. He further says that when the heart is weak, one should reduce only 4 lb. the first week, and 4 lb. *each month* thereafter. From my own experience it would seem to be a serious procedure in any case to reduce the flesh too rapidly.

It may be of interest to tell you that "Banting" is not confined to the human race ; for we are told by natural history observers that the wild goose is addicted to the same game. The northern goose migrates to the south, to sojourn there for the winter. Finding there, without any activity, luxuriant nutriment, it becomes over fat ; so that when spring comes, it is too weighty to fly to its northern summer home. Such geese know that they will be left in the rear by the flock if they do not prepare for flight by reducing their weight. They reduce their obesity before the time for flight arrives by eating less food, and filling their stomachs by eating sand in large quantities. This is followed by a loss of flesh and a regaining of the ability to fly far and fast. The sand, by its bulk, probably satisfies the appetite by occupying the stomach space, and probably scours out the intestinal canal. This may be instinct, but it seems more like wise forethought of the future requirements. Perhaps it may be too complimentary to call some people "geese."

CAUSES OF HEART SYMPTOMS.

The great question for us to consider is the cause of the heart symptom. If the water in the blood is greatly reduced the normal blood-pressure is consequently diminished, and this takes away an important stimulus to heart contraction, which the well-filled cavities excite. The heart is robbed of this stimulus to contract and acts feebly. This is one factor in the group of symptoms.

The simple loss of fat could not account for the heart symptoms in these cases that I have seen and examined; neither can all the symptoms be attributed to a disturbance of the inhibitory or other nerve of the heart. I am convinced that the rapid reduction of the flesh means a withdrawal of nourishment from the blood, and secondly from the heart muscle, as well as the nervous system. The symptoms all point to these conditions as being the factors of the symptoms.

CONCLUSIONS.

(1) The removal of the fatty material is the object to be obtained in reducing the weight. This is not harmful if it is accomplished slowly, and not carried to excess. The treatment should be always ordered and carried on under the surveillance of a physician.

(2) The rapid and extreme starvation of the heart muscles is positively dangerous to life in those with organic heart disease, or those who are weak or well advanced in years; so it is better not to meddle too much with the fat in such cases or to do so very gently, and frequently interrupt the treatment, and they should be constantly under the medical attendant's observation, and the heart should be sustained by cardiac tonics and stimulants.

(3) Starvation may suspend the appetite and later cause nausea, and lead to local adynamia of the heart from the loss of tone of the muscular fibre.

(4) Another serious symptom that may present itself in limiting the food too much is insomnia which is in itself a great reducer of fatness and a source of general weakness.

(5) If there are signs of heart weakness support that organ at once with heart remedies and interrupt the reducing process.

(6) If you treat a case for obesity first examine carefully the heart, and during the progress of the treatment watch closely for any heart changes, and if you even suspect weakness of the heart muscle the treatment should be at once suspended and the heart supported if necessary.

Remember that there are worse conditions than superfluous flesh. Therefore, it is better to keep it than to lose it rapidly or in an unhealthy way; this is particularly true in cases of hereditary obesity.

A NOTE ON RECENT STUDIES ON GRADUATED LABOUR IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

BY GUY HINSDALE, M.D.
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THE Nordrach system of treatment of pulmonary tuberculosis carried out by Dr. Walther and that of his predecessor, Dr. Brehmer, at Goebersdorf in Silesia, involves much exercise in addition to fresh air and alimentation; the Dettweiler system enjoins rest in the open air with super-alimentation. McLean's dictum is: "If the phthisical patient would live, he must work for it."¹ Possibly this advice should not be taken too literally, at least by every tuberculous patient, but graduated physical exercise has a very important and useful place in the treatment of most patients. Brehmer advocated hill-climbing, while Walther advises graduated walking exercises, in some cases to the extent of walking 20 miles a day. Whether one practises walking, or hill-climbing, or graduated labour, we cannot dissociate from these measures the effect of atmospheric air, in its various qualities, upon the lungs and the accompanying stimulation of the pulmonary and general circulation. Two recent papers by London practitioners are full of such suggestive thoughts on this subject that we call special attention to them. They are considered by some as marking an epoch in the treatment of pulmonary tuberculosis.

At a meeting of the Medical Society of London, January 13, 1908, Dr. Marcus S. Paterson, the medical Superintendent of the Brompton Hospital Sanatorium, at Frimley, read a paper on "Graduated Labour in Pulmonary Tuberculosis," which was supplemented by another on the "Effects of Exercise on the Opsonic Index of Patients suffering from Pulmonary Tuberculosis," by Dr. A. C. Inman,

¹ McLean, "Personal Observations in Phthisis Pulmonalis," *Journal A.M.A.*, February, 1898.

Superintendent of the Laboratories, Brompton Hospital.² The patients for whom Paterson instituted graduated labour were selected cases sent from the Brompton Hospital in London to its sanatorium at Frimley, at an elevation of 380 feet in the country.

He was induced to carry out this plan of treatment after seeing tuberculous patients who did well while working under unfavourable surroundings, but he believed that under careful regulation of labour and with very careful observation of the temperature records he might safely proceed. The exercises adopted involved all the muscles of the trunk and extremities, and this was thought to be better than walking exercises, in which the lower limbs were chiefly employed. The use of the upper limbs seemed more likely to favour the expansion of the lungs. It was not forgotten that the common objections to this plan of treatment are: (1) That the disease would become active again under the strain, and (2) that the exertion would tend to produce hæmoptysis. Considerable tact and personal influence must have been exerted to get the patients to carry out a plan which involved increasing labour and measures that were generally considered positively harmful.

The first exercise ordered was walking, the distance being gradually increased up to 10 miles a day. When a patient had reached this stage he was given a basket in which to carry mould for spreading on the lawns. No case of hæmoptysis or of pyrexia occurred among these patients. When they had been on this grade with nothing but beneficial results for from three weeks to a month, they were given boys' spades with which to dig for five minutes, followed by an interval of five minutes for a rest. After a few weeks several of the patients on this work, who were doing well, were allowed to work as hard as possible with their small spades without any intervals for rest. As they had all improved on this labour larger shovels were obtained, and it was found that the patients were able to use them without

² *The Lancet*, January 25, 1908.

the occurrence of hæmoptysis or a rise of temperature. About this time many of the patients were feeling so well that it became necessary to restrain them from doing too much.

These results in a few cases created a most favourable sentiment among the other patients, so that the system was extended generally, with great care and minute supervision. Harder work was prescribed for patients who could be trusted even to the use of spades, shovels, and 5-lb. pickaxes. The patients all expressed the opinion that the work did them good and that the harder they worked the better they felt. Many patients have written to Dr. Paterson to say that they date their improvement from the commencement of the labour and that they think the hardest work did them the most good. It certainly speaks well for the strict supervision of these patients that no accident occurred of a serious nature though several developed fever and subsequently pleurisy. One patient was laid up for two months and was much worse at the end of that time, though eventually he did well and returned to work, though the extent of his disease was increased through over exertion.

The suitability of cases for graduated labour rests on a very careful physical examination, importance being laid on the general muscular and physical development. Marked wasting and poor development is, naturally, a bar to this method of treatment. The resisting power of a patient with a very limited lesion is an unknown quantity and has to be determined, whereas a patient with a lesion involving four lobes may remain at work for some time, and exhibit a good initial resisting power.

Dr. Paterson lays very great stress on the temperature taken in the mouth. If this is or has been 99° F. or over during the week preceding admission to the sanatorium, the patient is put to bed after the journey. So long as the temperature remains at 99° F. in the case of men, or 99·6° F. in the case of women, the patient is not allowed up for any purpose. So long as the temperature is unaffected by exertion the patient is gradually allowed up for longer and longer periods. Patients with apparently limited disease, but who

are in poor general condition and without fever, are allowed to be up all day, but are not permitted to take further exercise than is entailed by walking to and from the dining hall for their meals. The remainder of the day is spent in resting. As their condition improves they are allowed to walk half a mile a day, then a mile a day, and so on, until a distance of 6 miles a day is reached. The rate of increase in the amount of exercise depends upon such factors as the patient's disposition, weight, and appetite. The grades of work are briefly as follows :—

(A1) Walking from one half to 10 miles daily.

(1) Carrying baskets of mould or other material.

(2) Using a small shovel.

(3) Using a large shovel.

(4) Using a 5 lb. pickaxe.

(5) Using a pickaxe for six hours a day. Patients in grades 1, 2, 3, and 4, work four hours a day.

The basket work, in which about 8 lb. of earth are carried, is considered the most important and, as a rule, patients spend far more time in this work than in any other. It brings into use all the muscles.

Work has a wholesome effect on the mind. If the patient is at first sullen and apathetic, the improvement in physical condition quickly begets a lively and cheerful mental attitude, and one that seeks work rather than to shirk it.

During 1905 and 1906, the number of patients discharged from this sanatorium was 164, and they all returned to their previous occupations, whatever they happened to be, and not to light out-door work. They were fitted by the line of treatment which we have described for effective wage-earning.

We have dwelt quite fully on this innovation in tuberculo-therapy, because it gives promise of good practical results, and, further, because it is so radically different from the prevailing methods adopted in most sanatoria. But the most interesting feature is the explanation which is offered to account for the benefits which have accrued.

This explanation is set forth in an elaborate study made by A. C. Inman, M.B., the Superintendent of the laboratories of

the Brompton Hospital, on the "Effect of Exercise on the Opsonic Index of Patients suffering from Pulmonary Tuberculosis."³

This study of Inman's was prompted and made positive by the brilliant work of Sir Almroth Wright. Wright showed in his Harveian Lecture in New York, that there are three great agencies by which immunizing responses can be evoked in the organism :—

- (1) By the inoculation of bacterial vaccines.
- (2) By artificially induced auto-inoculations.
- (3) By spontaneous auto-inoculations.

Wright had previously elucidated the subject of vaccine therapy by constructing curves from the opsonic indices of patients vaccinated against their infection, and in this manner traced a definite train of events which follow upon a single inoculation. The successive phases were termed the negative phase, positive phase, and the phase of maintained high level. Freeman, working in Wright's laboratory, then took up the subject of massage in its effect on gonococcal joints, showing that "*auto-inoculations follow upon all active and passive movements which affect a focus of infection, and upon all vascular changes which activate the lymph-stream in such a focus.*"

Wright's dictum was that "where in association with a bacterial invasion of the organism bacteria, or bacterial products pass into the general lymph and blood-stream, intoxication effects and immunizing responses, similar to those which follow upon the inoculation of bacterial vaccines, must inevitably supervene." It is a perfectly logical conclusion, then, that nature cures bacterial infections through such auto-inoculations. Inman set himself to find out what the body is doing of itself, and what value extraneous circumstances, such as physical exercise, have in aiding these attempts on the part of the body. Inman's work was conducted on a carefully planned technique, controlled and checked at all points, using forty-three patients in the sanatorium treated by the system of graduated labour.

³ Read before the Medical Society of London, January 13, 1908.

Inman found that in forty-one out of forty-three cases the opsonic index was at some time of the day well above the normal and, what is of even more importance, in no case did the exercise, even though severe, lower the index below the normal line—that is, the auto-inoculation was never so great as to produce a negative phase, and therefore never in excess. "It was observed during these investigations that in some bloods examined tuberculo-agglutinins appeared in association with the immune tuberculo-opsonins. This must be taken as another evidence of an immunizing response on the part of the organism. When the difficulties of such a method of treatment and the danger of the weapon employed are taken into consideration it will be readily understood that every now and then, in spite of the most careful supervision, an excessive auto-inoculation must take place. Such an over dose is readily recognized clinically. A patient doing well on the grade of work prescribed for him and with no abnormality of temperature, suddenly complains of feeling tired, of loss of appetite and of headache, and the temperature chart registers an elevation to 99° or 100° F. These are precisely the symptoms which are found during the negative phase after an excessive dose of bacterial vaccine."

Thus we have a new scientific test by which the effect of physical exercise on the blood of patients has been traced. As Inman says: "the opsonic index has shown that the exercise has supplied the stimulus needed to induce artificial auto-inoculation, and that this systematic graduation has regulated this in point of time and amount. This co-operation with the natural efforts of the blood, has enabled Dr. Paterson to send his patients back to their accustomed work, however hard it may be. But the investigation has done more than explain a successful mode of treatment. Dr. Paterson agrees with me that with the aid of the opsonic index he can regulate the stimulus with scientific accuracy and obtain his results more certainly and more rapidly. This, of course, involves work in the laboratory. But it also means a more rapid and a more certain discharge of the patient which is the main object of the sanatorium."

Fresh air, exercise, and proper food seem then to constitute the foundation of successful treatment of tuberculosis. The improvement of the general condition of the patient and life in the open air evidently need to be supplemented by certain exercises so as to produce a series of auto-inoculations, and probably the best method yet devised is by the system of graduated labour just described.

All sorts of exercises, such as horseback riding, golfing, light dumb-bell exercises and other calisthenics, have been practised for many years in treating tuberculosis; walking exercises have been the feature of some of the German sanatoria referred to; patients sent to the Western States and territories almost invariably practised out-door exercises, some with great harm and some with benefit. Neither physician nor patient in most instances regulated these exercises intelligently, but groped in the dark, never dreaming of the underlying principles as explained by laboratory studies of Sir Almroth Wright, Paterson, Inman, and others. We trust that further studies and the application of the same method in Europe and America will fix the value of exercise in tuberculosis.

Since the above was written we notice that a somewhat similar system of graduated labour has been adopted in the King's Sanatorium, near Midhurst. Light work in the gardens and grounds is prescribed in lieu of some of the walking exercise and forms part of the regular treatment. Practical gardening in the grounds and flower-beds is utilized. The lightest labour consists of weeding, hoeing, and edging paths and borders, gathering seeds, plucking dead flowers, pruning, &c. Somewhat harder exercise consists in wheeling soil to the lawns and spreading it, clearing ground of stones and taking them away in barrows, and in levelling new ground after being broken up. The heaviest work is that of digging and trenching unbroken ground, mowing, rolling, &c. Paths through the pine woods have also been constructed. In this particular work the breaking up of the ground with picks and clearing away of roots from neighbouring trees was allotted to the first division of patients. The second division cleared

away the broken ground and roughly levelled it. The third division finished the levelling of the paths with rakes and tidied up the edges.⁴

The patients at the King's Sanatorium have made a cinder tennis court ; they have cut down and sawed firewood ; they have an open-air carpenter's shop and an instructor in carpentry, who is himself a patient ; they care for the poultry and make the runs for the fowls. In this way six patients are constantly occupied.

An institution providing diversified occupations has a great advantage over one whose patients are restricted to walking exercises and where the women are employed in kitchen work and the men as laboratory orderlies, assistants in the drug rooms, clerks, and so on. It is well to vary the walking exercise with manual labour. Patients welcome it and take a great interest in the various occupations they are put to. They acquire confidence in themselves as they see their muscular tone improving and some prospect of resuming useful occupations.

⁴ Bardswell, Noel Dean. "Tuberculosis," Berlin, May, 1908.

THE BRITISH BALNEOLOGICAL AND CLIMATOLOGICAL SOCIETY.

BALANCE SHEET FOR THE YEAR ENDING SEPTEMBER 30, 1908.

RECEIPTS.		PAYMENTS.	
	£ s. d.		£ s. d.
To Balance at Bank, Sept. 30, 1907 ...	61 9 8	By Rent, 20, Hanover Square, 8 quarters to Christmas, 1908 ...	31 10 0
311 Annual Subscriptions for the year 1907—1908 ...	163 5 6	Porter " " 2 years to Sept. 30, 1908 ...	2 0 0
Arrears of Subscriptions, viz., 34 for one year, 11 for two years, 6 for three years, 10 for four and more years ...	66 3 0	Printers (Messrs. Bale & Sons) Journal Account to March, 1907 ...	65 6 9
Advertisements in the Journal (two years), £35 8s., less A. M. Viner's commission and expenses, £6 17s. 8d. ...	28 10 4	" " General Printing Account to June, 1907 ...	44 2 9
Sale of Journal (Messrs. Bale & Sons) ...	3 7 6	" " Payment on Account, Sept. 30, 1908 ...	120 0 0
Dr. John Braithwaite, cost of illustrations ...	3 3 0	Rent of Room for Library, one year to June, 1907 ...	2 12 0
		Reporting (three meetings) to Sept. 30, 1908 ...	5 15 6
		Editor's Clerk, two years to Sept. 30, 1908 ...	18 18 0
		Secretary's Petty Cash, two years to Sept. 30, 1908 ...	12 1 6
		Treasurer's Petty Cash to Sept. 30, 1908 ...	1 9 10
		Clerical Work (A. M. Viner) for late Treasurer Indexing Journal (1907) ...	3 15 2
		Annual Dinner Fund, deficiency ...	4 4 0
		Wreath (the late Dr. Joseph Groves) ...	1 1 0
		Medical Directory ...	0 11 0
		Returned Subscription (Dr. Warwick Brown) ...	0 10 6
		Balance at Bank, Sept. 30, 1908 ...	11 10 6
	<u>£325 19 0</u>		<u>£325 19 0</u>

LIABILITIES.		ASSETS.	
	£ s. d.		£ s. d.
To Printers, for Journal Account, £151 9s., less payment on account ...	31 9 0	By estimated value of Subscriptions in arrears, Sept. 30, 1908 ...	47 5 0
" " for General Printing Account ...	32 5 4	Estimated Income from Advertisements to Sept. 30, 1908, less commission and expenses ...	14 0 0
Balance, being excess over liabilities ...	9 1 2	Balance at Bank, Sept. 30, 1908 ...	11 10 6
	<u>£72 15 6</u>		<u>£72 15 6</u>

We, having examined the above account and compared it with the vouchers, certify that it is correct, and that the balance to the credit of the Society with the London and County Banking Company on September 30, 1908, is £146 1s. 3d., and cash in the Treasurer's hands, £13 2s. 6d., being £11 10s. 6d., together with the sum of £147 13s. 3d. for cheques not yet presented.

HENRY MCCLURE.
J. T. GARDNER.

October 23, 1908.

Notes and News.

A NOTE ON RIPON.

RIPON is situated in the West Riding of Yorkshire, on the western edge of the fertile plain of York, just at the junction of the river Skell with the Ure. Its altitude is 120 ft. above sea level, and the soil is gravel and sand. The surrounding district is undulating, and well wooded, and very beautiful. Close at hand are Studley Park and Fountains Abbey—the largest and most interesting monastic ruin in the country. A few miles to the West are the lofty moors, part of the Pennine range, and to the North are the Hambledon Hills and North Yorkshire moors. The sulphur water, which was brought down to the city from its source at Aldfield Spa in Skelldale, $3\frac{1}{2}$ miles distant, in 1903, had been for many generations held in great repute. In “The Beauties of England and Wales,” published in 1812, it is stated of this water that “it deserves to be better known. . . . The Spa is visited in summer by great numbers of country people, who scarcely ever fail of finding relief in all cases to which the use of sulphurous waters are adapted.” In its properties and composition it is very similar to the Harrogate mild sulphur water.

The climate of Ripon is mild compared with many other places in the North, though not relaxing, owing largely to the dry and porous nature of the soil. Vegetation and foliage are much earlier in the district than in many other parts of Yorkshire; hence it is suitable as a health resort in the winter and spring.

The city has a complete and modern system of sewerage, and an excellent water supply from Lumley Moor Reservoir, six miles distant.

The death-rate for the year 1907, was 11·4 per 1,000. The rainfall in 1907 was 30·43 in., and the average for the last ten years is 27·44 in. The cathedral, though not large is interesting, especially to archæologists, every style and period of

architecture being represented, from the Saxon crypt, the remains of the church built by St. Wilfrid in the seventh century, to the perpendicular style in the nave and aisles.

Ripon has a history dating back to Saxon times. Its first charter of incorporation was granted in 886 by Alfred the Great—the chief magistrate being then termed the Wakeman. This official caused a horn to be blown at the market cross every night at 9 o'clock, as a signal to all good citizens to close their houses, and draw bolt and bar, after which he was responsible for law and order in the city. This custom has been carried on ever since Saxon times, and the city horn-blower still nightly performs his functions on a huge horn at the market cross. There are, as might be expected in a city full of historical associations, many other old and curious customs—among which may be mentioned the annual procession and Feast of St. Wilfrid in the first week in August—which commemorates the saint's triumphant return in the seventh century to his native place, after his successful appeal to the Pope against the indignities which had been put upon him by the Saxon King.

In addition to the many objects of interest in the city itself, the neighbourhood abounds in places well worth a visit, among them being the Abbeys of Jervaulx and Rievaulx, Tanfield, with its Marmion Tower—tombs of the Marmions, and many others too numerous to mention.

G. R. GREEN.

Medical Officer of Health.

HASTINGS AND ST. LEONARDS-ON-SEA.

THE summer season has been a good one in every way. Apart from a bad spell at the end of August, the weather has been very fine, and the heat not excessive.

The sunshine records of July, August, and September show a total of 646 hours, 26 above the average, while the rainfall was below the average.

There has been no lack of visitors, and the amusements provided for them were very satisfactory. The approaching

autumn promises well, and welcome attempts are being made to revive the autumn season, which used to be the pride of the Borough. It is certainly the most delightful season of the year at Hastings, and the Amusements Association are to be congratulated on their new musical arrangements. We are to have, for an extended season, the Winter Orchestra in the Kursaal, which proved such a success last January. It was an excellent combination, well conducted, and, by the end of the season, it had become famous. Besides this, the usual town band is to play indoors when the weather is unpropitious. This is a new arrangement, and should have been made long ago. There are rumours of other great schemes, and we hope for more enterprise.

For visitors of a sporting nature, ample fare is provided. There is an excellent Association team carrying everything before it. A new Rugby Club has been formed. Golfers will be interested to hear that both courses are at their best, and both Clubs are in a highly satisfactory financial position. Altogether the season promises well.

BRIGHTON.

THE proposal to establish a Casino on the sea-front at Brighton will scarcely be welcomed by those who regard this favourite watering-place as a retreat for invalids. Brighton has hitherto been largely resorted to by the busy, jaded man of business, with only a free week-end at his disposal, and who has found the place both accessible and acceptable. His rest and repose on Saturday afternoon there is not likely to be enhanced by finding himself surrounded by a number of excursionists, attracted by cheap railway tickets, including, perhaps, admission to this wonderful "Palace of Varieties," returning at any hour, and in any condition, up to midnight. Brighton is sometimes shunned by invalids as being merely "London by the Sea." The presence of a Casino, with its many qualities, meritorious or meretricious, will not lessen this stigma.

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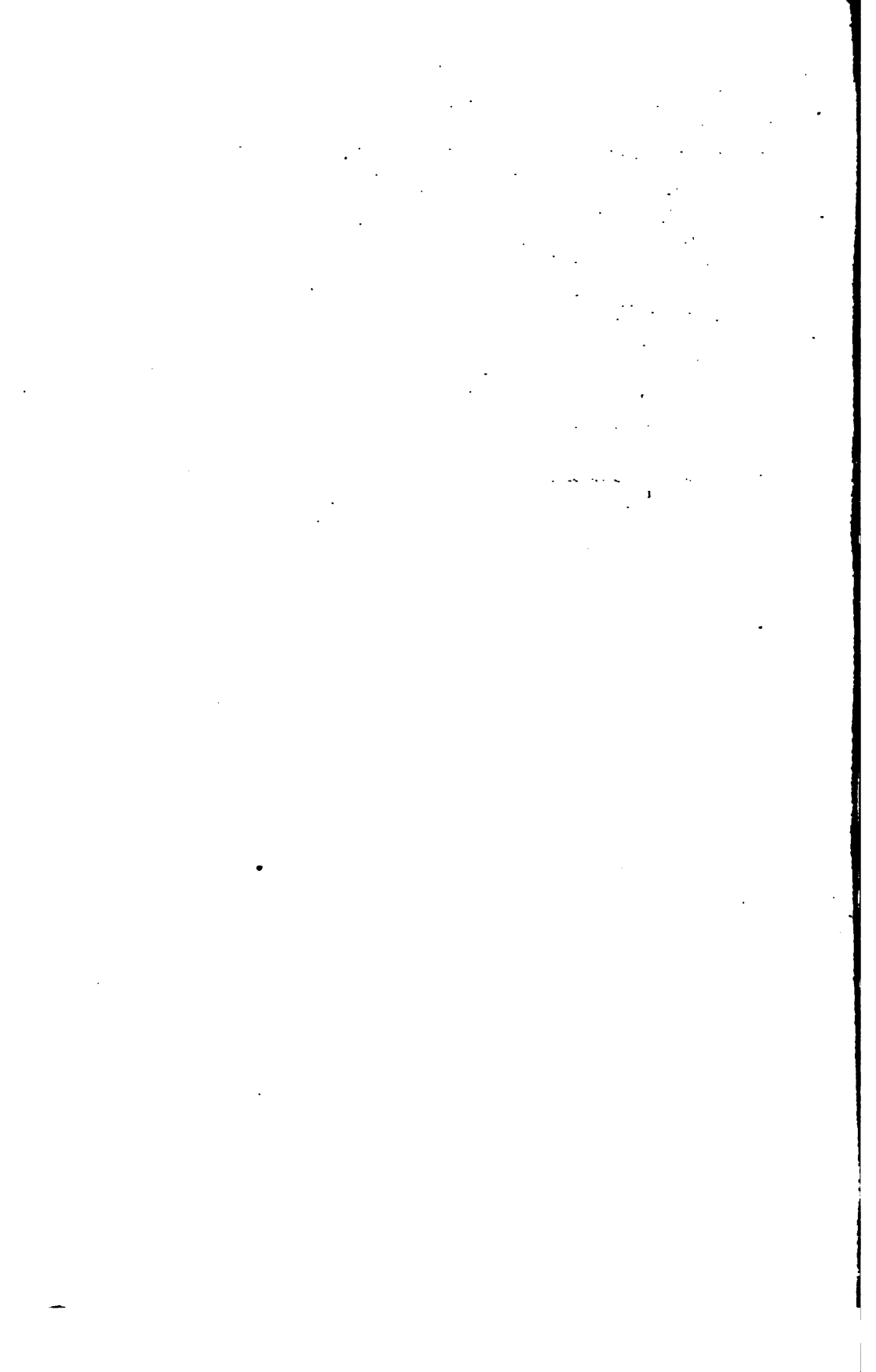
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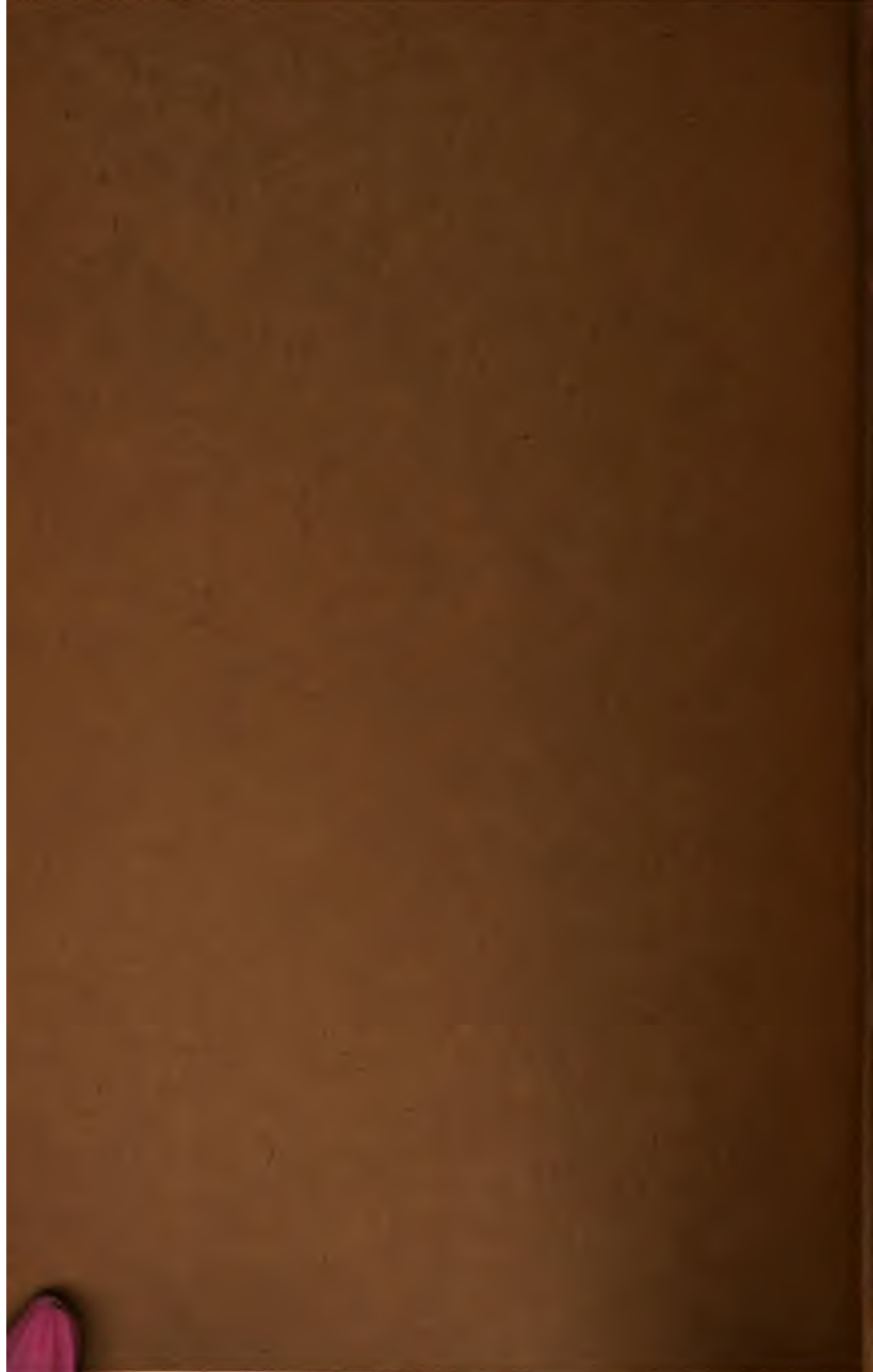
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